

# **ELECTRICAL CONTRACTING**

**ENGINEERING • INSTALLATION • REPAIRING • MARKETING**

**JUNE • 1935**

## **New Service Shop Section Starts in This Issue . . . . .**

- Labor Costs for Moving Wiring
- Space Saving Conduit Routing
- Small Job Reinspection Results
- Cellular Steel Floor Wiring
- Getting Customers Into the Shop
- How the Contractor Sells

# Here Is a NEW G-E Floodlight Designed for Filling Stations

The new 300- to 1500-watt open-type floodlight, Type AL-46.



**E**STIMATES of the number of filling stations that need and can profitably use good floodlighting place the figure as somewhere between 30,000 and 40,000. Here is a wonderful market for the electrical contractor—in the sale of floodlights, lamps, poles, switches, cable—as well as in the work of installation.

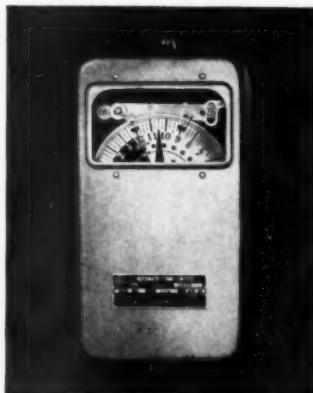
**HERE IS A NEW** General Electric floodlight, Type AL-46, just announced for filling stations. Advertisements are now appearing in filling-station magazines; a descriptive publication (GEA-2099), giving prices, is ready for you; information on the unit is in the hands of General Electric and G. E. Supply Corporation salesmen.

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500-146

**GENERAL**  **ELECTRIC**

S. B. WILLIAMS

Editor

F. J. SEILER

Assistant Editor

GLENN SUTTON

Manager

# ELECTRICAL CONTRACTING

*Established 1901*

Official Publication  
of the  
National Electrical  
Contractors' Association

## INSTALLATION

## ENGINEERING

## MAINTENANCE

## REPAIRING

## MANAGEMENT

## MARKETING

*for*

## ELECTRICAL CONTRACTORS

INDUSTRIAL

COMMERCIAL

RESIDENTIAL

## ELECTRICAL INSPECTORS

## ENGINEERS

## SERVICE SHOPS

and others engaged  
in the business of  
electrical construction

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*Published Monthly by*

The Electrical Trade Publishing Co., 330 West 42d Street, New York  
520 North Michigan Ave., Chicago 501 Guardian Building, Cleveland

HOWARD EHRLICH, PRESIDENT

Member Associated Business Papers, Inc., and Audit Bureau of Circulations. Also Publishers of Mill Supplies and Electrical Wholesaling. Subscription: U. S. \$2; Canada, \$2.50, including duty. All other countries, \$2.50 per year. Single copies 25 cents. Entered as second class matter February 20th, 1935, at the post office at New York, N. Y., under the Act of March 3, 1879. Copyright 1935—Electrical Trade Publishing Co.

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1,635,829	1,798,186
1,772,436	1,410,790
1,765,000	1,536,519

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WHITE  
RED  
GREEN  
BLUE  
YELLOW

1935 is the 25th anniversary of "U.S." Rubber plantations in the Far East. And the crude rubber production of "U.S." is now more than three times the combined output of all other American rubber companies combined. Controlled quality from the rubber tree, to the finished product, assures extra value and extra performance for the user.





JUNE

1935

## Now—What?

**D**URING the past year the electrical contracting industry has, as the result of its Code of Fair Competition, to a considerable degree achieved the correction of a great many of the competitive evils which were virtually allowing the members of the industry only a gambler's profit. As we go to press, however, the Supreme Court of the United States has declared the National Recovery Act unconstitutional. Every thinking man in the industry, who has seen the beneficial results of the Code, is therefore conscious of the question, "Now, what?"

**W**HILE there is no question but what the fear engendered by possible federal prosecution had a considerable part to play in much of the compliance, it must be remembered that no other sub-contracting division of the construction industry achieved anything like the measure of success with its Code, as did the electrical contracting division. It must be apparent, therefore, that something besides the fear of the Government was essential if codes were to be made to work.

**I**N the case of the electrical contracting industry there were two factors; one a national association with the ability to organize for this work, and the other, the will to self-govern. Without the National Electrical Contractors Association, it would have been impossible to create a local administrative organization of the character and capacity of that which administered the code in 350 trading areas. While without the will to self-govern, it would have been impossible to secure the degree of compliance, or the voluntary payment of assessments by nearly 10,000 electrical contractors.

**T**HE industry has the opportunity to take full advantage of both of these strong constructive influences. Now that the Code no longer exists the industry will have to prepare itself for self-government unaided by any federal agency to enforce compliance. To accomplish this, the industry must renew its allegiance to its national association, and give it the encouragement to undertake a planned program for the perpetuation of the principle of industry self-government.



Half a dozen household appliances on a single overloaded circuit. Double and triple sockets. Strange gadgets and make-shifts.

Has the Great American Home gone completely haywire?

It looks that way—in all too many cases. Contractors who have looked around know what a surprisingly large number of otherwise modern homes contain antiquated, haywire electrical installations.

What has happened? Who is to blame? Not the home owner. The electrical contractor? Partly, but not entirely. The big bad depression? Only partly.

Strange to say, the biggest cause of wiring inadequacy today is—*progress!* Progress has gotten ahead of home wiring.

One by one, new electrical appliances, new electrical conveniences have found their way into homes—*because people wanted them.* They are going to want more in the future. They want to keep up-to-date.

Result—the wiring installation that was ample to carry the load ten, or even five years ago, is inadequate today. The average home electrical load has grown enormously.

Never has the electrical contractor found himself face to face with a greater, more clear-cut opportunity. Reports from every side indicate the public is in more of a buying mood than at any time in years. But the public will not and can not buy wiring by itself. It must be shown—and sold. And it's up to the electrical contractor to do the selling.

Hint—it isn't hard to find an excuse to look at wiring in homes in your vicinity. Offer an inspection as a free service. You may be surprised to find yourself far more welcome than you expected.

Step two. Note the serious inadequacies, the inconveniences—possibly even, the electrical hazards—that may be present. Call them to the attention of the home owner. Sell him. But sell him convenience, comfort, safety—not just wire and outlets.

Step three. Don't stop there. You may know of lots of electrical improvements, new ideas, new conveniences and comforts. But, the chances are, your customer has never heard of them. Educate him. Bring him up to date. Tell him about built-in appliances, better lighting, future possibilities in all-year air condi-

tioning. Tell him—and sell him!

And when you do, sell him a quality job that won't come back to reproach you later. (If you can sell a "cheap" job, you can sell a quality job.) It will pay.

To Contractors who see their opportunity, and who are ready to go out and grasp it, Graybar offers its wholehearted support. Some of that support is represented by the dependability of electrical materials from Graybar. Let Graybar's 66 year old reputation for quality stand behind your own business reputation.

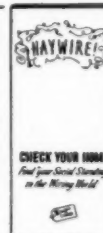


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EC 6-35

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Electrical Contracting, June 1935

# ELECTRICAL CONTRACTING

Vol. 34

JUNE, 1935

No. 8

▲  
S. B. Williams, Editor  
▼

## FIELD BRIEFS

● MAJOR LEAGUE BASEBALL has finally fallen to the temptations of night lighting. The first game was scheduled for May 23, at Cincinnati, with the Reds opposing the Phillies. The minor leagues have reported night baseball a real financial success.

● ANOTHER TITLE for the list of best sellers is the new Labor Unit Estimating Manual published by the Southern California Chapters, N.E.C.A. It is reported that the demand has come from all over the country, and that already the first edition is exhausted and another edition is being printed.

● IN MOUNT VERNON, N. Y., all notices of defective wiring are placed where anybody may have access to them. The newspaper reports them. Result — between eighty and ninety per cent of the defects have been taken care of.

● INDUSTRIAL SAFETY is handled in the state of New Jersey by twenty-five district inspectors. Safe grounding and lighting play an important part in the regulations of the Department of Labor under direction of which these industrial inspections are made. Unsafe conditions must be corrected, other-

wise this department has authority to order factory shutdowns. Frequently these corrections mean sizable wiring jobs for contractors.

● WITH THE GROWING VOLUME of rebuilt and used motors coming on the market, there would seem to be an excellent opportunity for some one to set up a minimum test standard. It is understood that such a standard is being proposed for use in Toledo, Ohio.

● WHAT MAY EVENTUALLY become a \$70,000 residential wiring job has now been in progress for four years, and L. W. Maxey, Jr., Keller-Pike Co., Philadelphia, Pa., predicts about three years before completion. By that time he will have a first hand knowledge of American-wired "castles."

● A NOTEWORTHY F.H.A. endorsement which was transmitted in a letter to President Roosevelt by a disabled electrical contractor recently received wide circulation in the building news section of the daily press. Louis D. Rubin, Charleston, S. C., met with adversity in his contracting business and in his health, so that the Rubin Electrical Company, which had been advertised as "Charleston's

Leading Electrical Store," had to be closed, while Mr. Rubin was disabled for life. The assistance of F.H.A. financing enabled this contractor to build a modest home for his family on the edge of the city and gain a new outlook on life. This dramatic incident which was so ably narrated in Mr. Rubin's letter to the President, might well inspire our own industry to greater selling effort in cooperation with various local F.H.A. activities.

● A SUPER RED SEAL specification is being drawn up to take care of Kansas Citians who want the last word. More outlets, more switches, larger circuits will soon be in order. In some places this is known merely as "adequate wiring," but where Red Seal is already making an impression as adequate wiring something "Super" is necessary in order to promote the industry's standard of adequacy.

● GREENHOUSES may be offering a new wiring market of considerable proportions soon. Experiments with insulated houses using very little glass and getting most of their light and all of their heat from 500-watt incandescent lamps in RLM reflectors, spaced on 3 by 3½ ft. centers, have produced blossoms in one-third less time than is customary.



**Concentration of Runs**

This general view of the 30th floor ceiling space shows the concentration of one-hundred-and-thirty-three runs of 3-, 3½- and 4-in. feeder conduits, weighing about thirty-two tons. These are routed from several riser points to converge beneath two feeder switchboards on the floor above, which are installed at right angles to each other so as to save room space.

## Space Saving Conduit Routing

**D**IFFICULT problems were involved in designing the pull boxes and feeder conduit racks in the Italian Building of the Rockefeller Center group, New York City. About thirty-two tons of feeder conduit had to be routed and banked in a coordinated manner which would allow the required space and clearances for other crafts, yet also permit a concentrated installation at the load center. This large amount of material was also required to be held close to the ceiling so as to permit a furred false ceiling below of maximum height.

This installation occurs on the thirtieth floor, below the transformer rooms, the network protective equipment, and two adjoining feeder switchboards, which

serve the upper twenty floors of this forty-story structure.

The methods which were employed by J. Livingston & Co., New York, N. Y., in routing and banking these large conduits, anticipated: (1) Clearance for other equipment requirements; (2) correct leveling sequence to avoid space-wasting conduit crossovers to lessen expensive bends, and to prevent difficult make-up of odd-shaped lengths; (3) maximum use of racks or trapeze hanger capacity, and (4) provisions for the greatest possible ease of cable pulling. The coordination of the many feeder runs entering and emerging from pull boxes with reference to their respective riser shafts, makes such layouts an interesting part of large jobs.



**Deep Pull Boxes**

Deep pull boxes were designed so as to accommodate banks of conduit racked 4-deep, as in the upper right background. The combined weight of these heavy conduits and feeder cables required substantial 3-in. channel iron racks at 7- to 9-ft. centers.



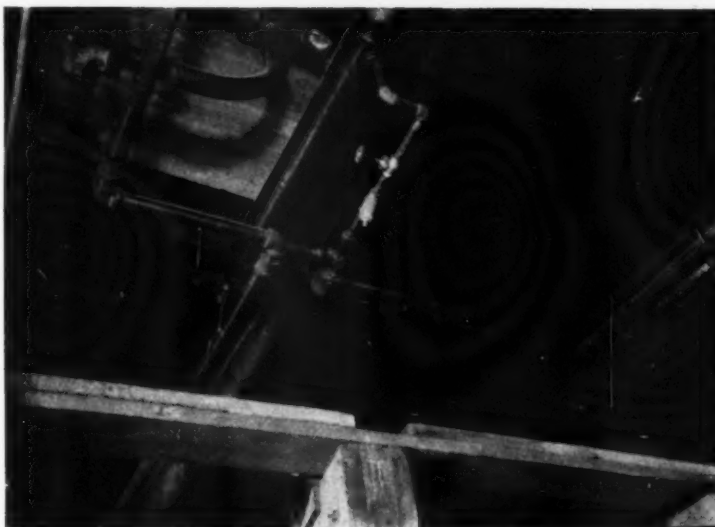
### Flange Type Couplings

This 4-layer conduit rack allows ten feeder conduits to pass above a horizontal plumbing line (upper right), while nine are hung below. One set of running-thread hanger rods at each supporting point was thus used to full advantage. The bolted-type side-flange couplings in upper foreground were quite generally employed for making up conduit runs between sections which involved sweeps or ells, thus eliminating running threads. The coupling employs standard pipe threads, but is normally sprung open to over-size until it has been clamped upon the butted ends of threaded conduit. Two heavy clamping bolts must be tightened to a squeeze fit.



### Piping Coordination

The entire layout was coordinated with the piping systems of other crafts. An 8-in. heating line had to be bridged so that it would not interfere with under-switchboard pull boxes, and the many conduits which converged at the opposite end and in the upper right. Steel troughs were provided to unite a center collecting pull box with two adjoining under-switchboard junction boxes instead of using a large number of conduit nipples. The end of one lengthwise box can be seen in upper left, while a second crosswise under-switchboard junction box appears at the upper right foreground. The latter junction box is for a feeder board which is set at right angles to the left side board.



### No Difficult Bends

The eighteen 4-in. main feeder conduits which stub down from the network protective busses above are gracefully routed above a maze of racked riser conduits to the under-switchboard junction box in the extreme background. Note the absence of difficult bends and hard cable pulls in this layout.



# **"Is the Electrical Contractor Too Good a Salesman?"**



**—asks J. W. Wilmer,**  
*Chewning & Wilmer, Inc., Richmond, Virginia*

**A**LARGE portion of the volume of electrical materials sold in normal times is for the wiring system and electrical equipment of new buildings, no small part of which is in extras. How do these extras come about? Since the plans and specifications drawn by the architects are usually complete, as far as present day standards go, the extras must arise because the electrical contractor has been a good salesman. He has sold additional outlets, door switches, bells, annunciators and interphones. He may have substituted conduit for other forms of wiring, or he may have sold the owner on the idea of underground wiring for outside work instead of the unsightly overhead wiring. He may have sold outdoor lighting, pilot switches or no-fuse load centers.

A large residence was built in Virginia a few years ago and when bids were received for the electrical work the average bid was about seven hundred dollars. The electrical contractor by selling the owner, the general contractor and the architect on the items mentioned above did over \$6,000 worth of electrical work on that one job. While this is an exceptional case it is true in a lesser degree of practically every job of new work. The owner, of course, had a lot to say about the extra cost. Was the electrical contractor too good a salesman?

It is natural for all of us to put the greatest effort into those fields which offer the greatest opportunity for profit. There was a time when the electrical contractor had many fields, and one of the largest of these was the industrial and commercial establishment. He did such a good job of selling that before long the manufacturer and wholesaler began to enter the field. The average electrical contractor in the past several years has sold the industrial and commercial establishment on thousands of items of electrical material; but he has not gotten the order because his customer has been able to purchase elsewhere more economically. Has the electrical contractor been too good a salesman and by reason of that fact hurt himself by attracting the manufacturer and wholesaler into the fields which he properly should handle?

The electrical contractor has been accused of not

being a salesman. As a matter of fact, he is a good salesman today, as he has been in the past, and in the field of new construction, which is the only field left to him, practically speaking, he is doing a wonderful job. He would do just as good a job in other fields if he had a compensating margin of profit.

While he is a good salesman, he is a poor advertiser, and this is evidenced by the fact that his efforts are not appreciated to the extent that they should be. He goes about his work quietly and he does not, as a general rule, publish all that he does. His opportunity comes every day because there is never a job that he gets on which he does not run into a prospect for something in the electrical line, and every day he takes advantage of these opportunities. This is one of the reasons for his efforts being so little understood and appreciated. We hear always of the selling job done on a big order, or even a medium sized job; of the sales effort put forth, of the sales arguments used, and of the wonderful work some salesman has done. In the course of a year, however, it is entirely probable that the thousands of small sales, each requiring sales effort, would amount to more than the few relatively large ones about which we hear so much. Who would do the selling necessary to develop this tremendous volume of business if the electrical contractor did not?

## **Everyday Plugging**

We have had enough of this so called "campaign" selling which has gotten to be old stuff. What we need is more of the old fashioned everyday plugging in our sales effort, and more fields in which to exert that effort. The industrial field offers the best opportunity today as business looks up; for the industrial plants and commercial establishments will wish to get their houses in better order so that they may be in a position to take full advantage of the upturn. The electrical contractor is prepared, ready, and anxious to have a fair opportunity of developing this field if he is allowed to do so, and put into a position to do so profitably. Even with conditions as they exist at present the electrical contractor has done much of the selling in this field for which he has gotten no credit.

The electrical contractor can sell and does sell but he must of necessity sell in the fields where he can make a profit. He has been hiding his light under a bushel for years. What he should do is to start an advertising campaign to tell the industry and the world at large just what a good salesman he is.

# 500 Industrial Customers Inspect New Service Shop

*Through lure of lighting and  
motor control exhibit*

**A**N EFFECTIVE way of getting customers into the service shop was employed by the General Electric Specialty Company, Jamaica, N. Y., through the staging of an Electrical and Mechanical Exposition in the new quarters to which it had recently moved. These new quarters had been laid out with all of the modern developments in store and factory lighting as well as motor control.

To carry out the idea of an exhibit, two thousand letters were sent to industrial customers with admission tickets enclosed. Fairly extensive advertising space was used in local Long Island papers.

The display was advertised as an exhibit of the latest developments in electrical and mechanical equipment and accessories, including modern lighting, and a view of the modern repair shop. It lasted for two weeks, and was open from 1:00 P.M., to 9:30 P.M. daily.

A number of manufacturers cooperated in furnishing exhibits of their products, as can be seen, thereby making the display much more effective.

An average of fifty people a day, or around five hundred, all told, visited the exhibit, of which almost 20 per cent represented very much worth while industrial customers. All visitors were asked to register.

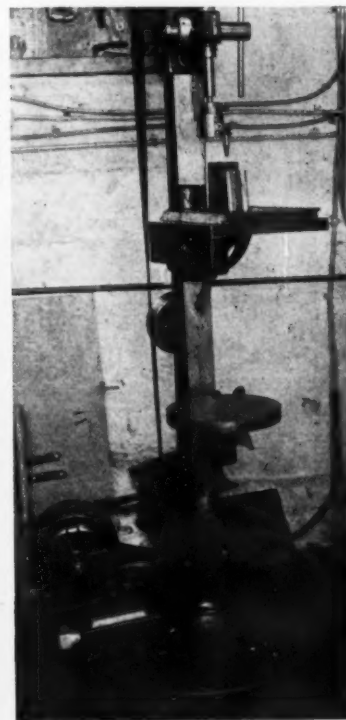
While the material displays gave the real exhibit touch, the purpose back of the exhibition was to take customers through the service shop to demonstrate the character of workmanship, and to show them possible applications of lighting, control, etc.



A general view of the office, showing temporary displays installed by various manufacturers. At the upper left can be seen a modern type of store window lighting, giving four levels of intensity. They are controlled by a time clock shown on the rear wall.

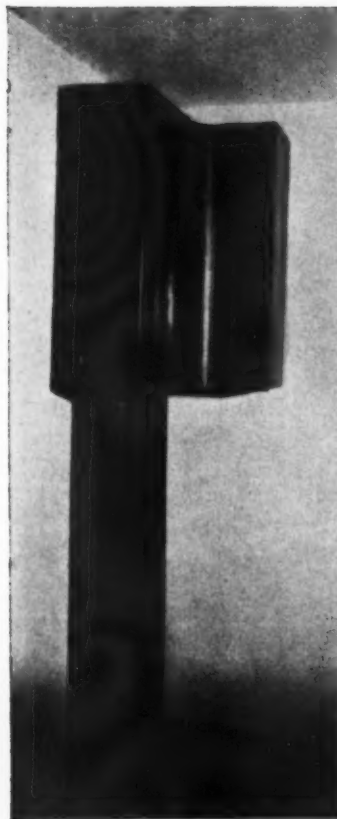
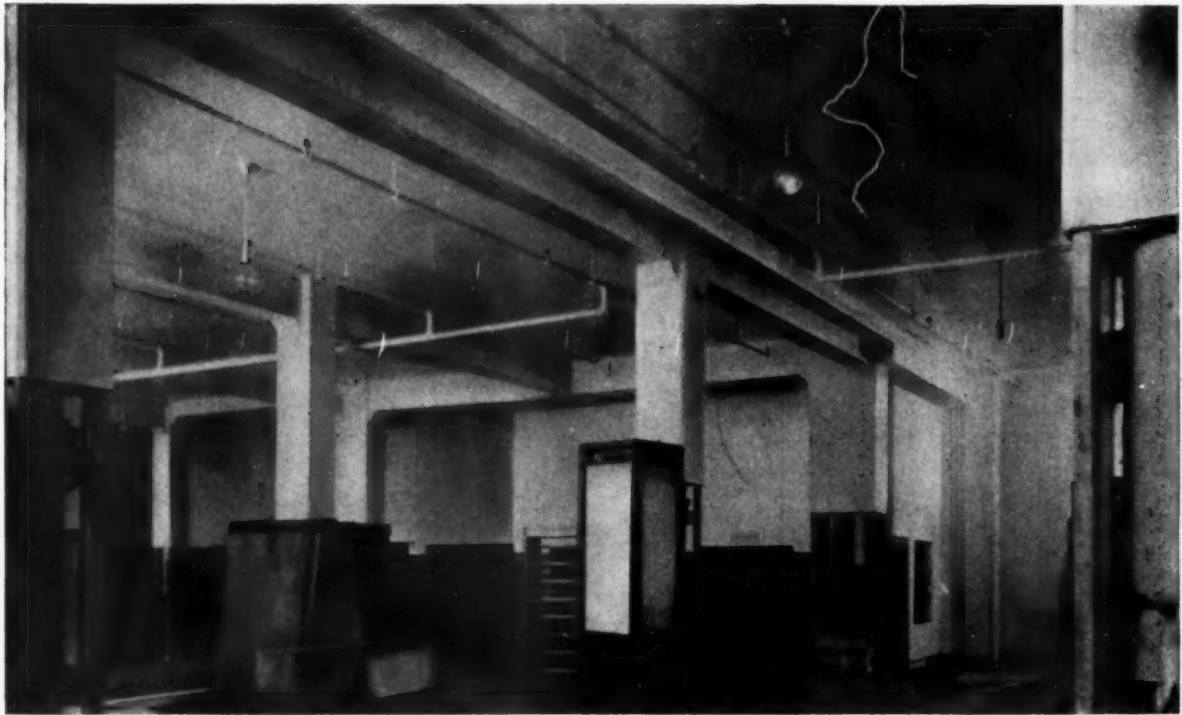
Each of the machines was an "exhibit" to demonstrate the use of short center drive, motor bases, foot control, etc.

A general view of the shop, with particular reference to the permanent exhibit of high intensity glass-steel diffuser industrial plant lighting.





## Concealed Rewiring for



(Above)—Each typical sales floor ceiling was finished in lath and plaster against wooden joists. Notching for conduits was not permitted for bringing the home run conduits from the panelboard in the right background to each lengthwise row of bays. A false conduit-concealing beam was therefore furred along the side of the larger beam which extends from the panelboard partition toward the column in the left foreground. Six to eight 1½-in. conduits containing No. 10 circuits are brought in this furred space across the room. Removable covers are provided on the face and lower sides of the furred beam for maximum accessibility. The circuit conduits are stubbed up and elled out to run between joists from these junction boxes to the lengthwise rows of ceiling and column outlets.

(Outside Left)—New main feeders were brought down a stairwell in three 4-in. conduits to the main service equipment. A 30-in. high, L-shaped pull box was designed to hug the corner of a stair landing. The box depth was limited to 9 in., but was extended at right angles for 18 in. along both building walls to permit three 4-in. service conduits to enter the box in a horizontal line at the top.

(Left)—Existing round iron columns were boxed in and paneled. Rigid conduit was dropped down as far as feasible, from which point, because of limited working space, flexible conduit was extended to the exact outlet box location.



# Adequate Store Lighting

**I**N rewiring a 30-year old five-story office building at Roanoke, Va., for a department store, the Richardson-Wayland Electric Corp., of that city, provided a lighting system which will deliver 25-foot candles upon the various sales floors. A wiring job of over \$20,000 resulted.

A wiring layout was provided for the new system which would be adequate to efficiently carry a further increase in wattage of 33½ per cent at some future time. The new 750-watt main fixtures are connected in pairs to No. 10 branch circuits. Since none of these circuits are very long, a later change may safely be made to 1000-watts without objectionable voltage loss. The feeders are also over-size to meet the foregoing circuit provisions for increased wattage.

None of the old wiring was found to have any value under the new layout. Maximum lamp efficiency and modern intensities of illumination were considered more important to the future store operators than the possible remodeling savings that could be realized by re-using portions of the old circuits. The installation was therefore completely remodeled to meet every modern requirement.

Of particular interest to the contractor are the means used to provide a concealed system while conforming to existing building construction. A number of these methods are shown in the accompanying illustrations.



One of the problems involved concealing the short runs of wiring between the numerous unit heater motors, thermostats and controllers. Concealed branch circuits were terminated in flush ceiling outlets directly above each motor, and from this point a concealed conduit was stubbed down in the wall to a flush outlet box located below the thermostat. Exposed, flexible steel conduit was attached to a flush cover provided on the ceiling outlet, and connected to the motor terminal housing. The surface-mounted motor control unit was connected with flexible cord which was brought from the wall outlet box through a composition one-hole plate.

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## Labor Cost for Moving Electrical Equipment

By Ray Ashley

**F**OR the third article in our series on labor costs, we have selected a revision involving the moving of a wire shaft and eleven metering closets, made necessary by the installation of an additional elevator. In order to have this new elevator beside the existing bank, it will be necessary to use the space now occupied by the metering closets and the wire shaft serving them. While the electrical equipment will not be moved any great distance, the work involved will be about the same as if the distance were much greater.

The size of this revision greatly exceeds that of the average, similar type job encountered nowadays, but the items of labor are practically the

same. It is the purpose of this article to give some idea of labor costs and to list the important items of labor to which units should be assigned.

Many contractors, due to long experience, have a faculty of being able to look over alteration work, and give fairly accurate figures on the cost of labor. In order to secure work at remunerative prices, however, this faculty must be strengthened by the ability to analyze the detailed operations which will be necessary. Lack of this ability frequently results either in underpricing labor, due to overlooking some important operations, or in overpricing the work, due to fear

of what may have been overlooked.

An analysis of the estimates on a piece of work, very similar to the one covered by the accompanying tables, was made after the completion of the job. It was found that the majority of the contractors had not only overlooked some important items, but had used units for the items listed which were too low. The contractor who secured the job found that even the cost of installing new materials ran higher than they ordinarily do on new work. Also, the reader should be reminded that the unit costs on the job just mentioned were about 12 per cent higher than those listed in the accompanying tables, because the owner's

superintendent gave little consideration to the electrical contractor in planning the other work.

The underpricing of labor does not necessarily occur on that part of the work covering the removal of old equipment, for it often happens that the cost of re-installing the equipment greatly exceeds the estimate. One is prone to figure labor for re-installing the same as he would for new work, but there are many things which may happen to increase this cost. Materials may have to be moved often, panels may need repairs, fittings may be lost, and numerous other things can happen which will delay the progress of the job. Although this article is on labor, it should be remembered that where old materials are to be re-used, there is always a material item required to cover the loss of conduit and fittings, the breakage of panels, and miscellaneous material to meet any slight change in conditions. In the accompanying sketch it will be

noted that in the new layout, all the meter fittings are on the same side of the panel. This means that when the change is made, conduit openings in the side of the cabinet will have to be closed and some changes will have to be made to accommodate the new position of the meter fittings.

It would be a fallacy for one to try to cover every possible item of labor, because, in the first place, it could not be done, and in the second place, after the salient points are covered, there is a limit to how much time one is justified in using to sort out the minor ones. For this reason, it is always necessary to have a miscellaneous labor item. It should be the aim of every contractor, however, to keep this part of his estimate as low as possible and still have an accurate cost.

#### Equipment to Be Moved

1,969 man - hours was charged to productive labor for the completed job. It is hard to visualize the multiplicity of operations involved in this work without carefully studying Table 4.

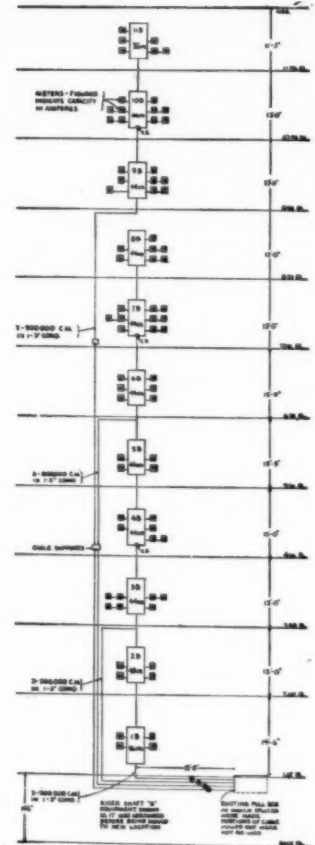


TABLE 1  
Labor Required for Moving a  
44-Circuit Metering Panel and Cabinet

ITEM	QUANTITY	LABOR UNIT MAN-HOURS	EXTENSION MAN-HOURS
Disconnecting mains.....	3	0.33	1
Disconnecting metering connections.....	10	0.2	2
Disconnecting branch circuits and tagging.....	30	0.13	4
Removing upper panel.....	1	0.5	0.5
Removing lower panel.....	1	0.83	0.83
Removing cabinet and storing.....	1	2.67	2.67
Getting panel and cabinet and delivering to new location.....	1	1.33	1.33
Erecting cabinet and making conduit connection (Two 3-in. and three 1 1/2-in.).....	1	8.33	8.33
Installing panels and interconnecting (2 sections).....	1	2.67	2.67
Connecting mains.....	3	2.17	6.5
Connecting branch circuits.....	30	0.33	10
Putting on trim and doors.....	1	1.0	1
Miscellaneous labor.....			1.33
Total.....			42.17

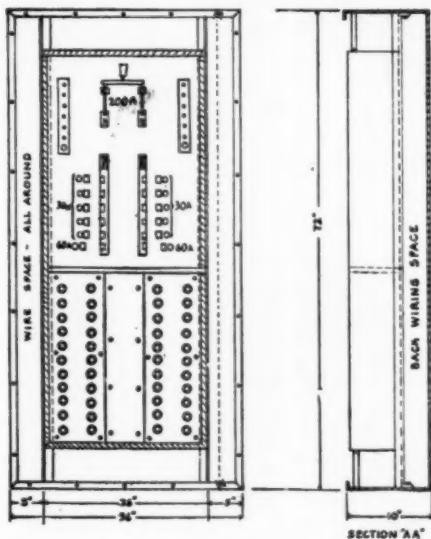
TABLE 2  
Labor Required for Moving a  
Metering Panel and Metering Equipment

ITEM	QUANTITY	LABOR UNIT MAN-HOURS	EXTENSION MAN-HOURS
Moving panel and cabinet (see Table No. 1).....	1		42.17
Removing 30-A-2-wire meters and storing.....	10	0.5	5
Removing meter fittings and storing.....	10	4.2	4.2
Removing meter boards and storing.....	2	1.17	2.33
Installing meter boards.....	2	1.67	3.33
Installing meter fittings.....	10	1.08	10.83
Installing meters, 30-A-2-wire.....	10	0.92	9.17
Miscellaneous labor.....			1.5
Total.....			78.5

Note: Above units to include time required for putting equipment in store room (on same floor) and getting out again.

TABLE 3  
Labor Required for Moving and Re-Connecting a  
Metering Panel, Metering Equipment and Extending  
Branch Circuits to Same

ITEM	QUANTITY	LABOR UNIT MAN-HOURS	EXTENSION MAN-HOURS
Moving metering panel and equipment (see Table 2).....	1		78.5
Pulling wires out of conduits which were to be cut off.....	Cts. 30	0.55	16.5
Cutting off branch circuit conduits:			
1/2 in.....	6	0.42	2.5
3/4 in.....	4	0.42	1.67
1 in.....	1	0.5	0.5
Setting 48 in. by 15 in. by 8 in. splice box.....	1	3.13	3.33
Setting 4 in. by 4 in. by 1 1/2 in. splice box.....	1	0.58	0.58
Connecting branch circuit conduit to splice boxes:			
1/2 in.....	6	0.5	3.0
3/4 in.....	4	0.5	2.0
1 in.....	1	0.67	0.67
Installing conduit from splice boxes to new location of metering panel			
1 in.....	Ft. 40	0.1	4.0
1 1/2 in.....	Ft. 60	0.13	8.0
Installing 1 in. elbows.....	2	0.25	0.5
Installing 1 1/2 in. elbows.....	6	0.33	2.0
Pulling original branch circuit wires back into conduits.....	Cts. 30	0.25	7.5
Splices in splice boxes (No. 14 wire).....	60	0.17	10.0
Pulling in No. 14 wire from splice boxes to new location of meter panel.....	Ft. 1500	0.007	10.0
Cutting wood floor and cleaning out fill.....	Sq. Ft. 5	0.67	3.33
Patching floor.....	Sq. Ft. 5	1	5.0
Miscellaneous Labor.....			1.5
Total.....			161.08

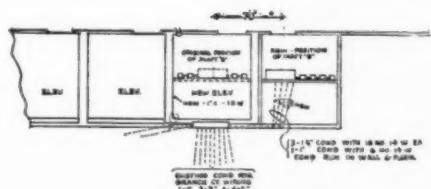
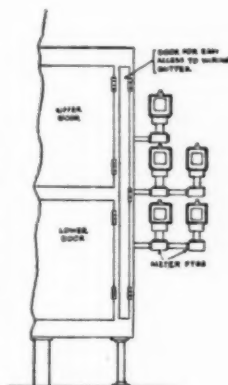


**Meter Panel**

42.17 man-hours was charged to moving this metering panel and cabinet. See Table 1 for distribution of the time.

### Metering Panel and Metering Equipment

78.17 man - hours was charged to disconnecting, moving, and re-connecting this equipment. The total time may seem high, but the individual labor units, as shown in Table 2 are very conservative.



**Shaft Was Moved 7 Ft.**

161.08 man-hours was required to move and re-connect one metering panel together with meters and metering equipment, and to extend and connect branch wiring circuits. Table 3 shows the break down for this time.

**TABLE 4**

### Labor Required for Moving Electrical Equipment From Existing Wire Shaft to New Location (Complete Job)

ITEM	QUANTITY	REMOVING IN MAN-HOURS		INSTALLING IN NEW LOCATION IN MAN-HOURS	
		LABOR UNITS	EXTENSION	LABOR UNITS	EXTENSION
25-A. 2-wire meters.....	56	0.5	28.0	0.32	51.33
25-A. 3-wire meters.....	5	0.5	2.5	1.08	5.42
50-A. 3-wire meters.....	9	0.75	6.75	1.42	12.75
100-A. 3-wire meters.....	2	0.92	1.83	2.0	4.0
30-A. 2-wire meter loops and fittings.....	56	0.42	23.33	1.08	60.67
30-A. 3-wire meter loops and fittings.....	5	0.42	2.08	1.33	6.67
50-A. 3-wire meter loops and fittings.....	9	0.58	5.25	1.83	16.5
100-A. 3-wire meter loops and fittings.....	2	0.75	1.5	2.5	5.0
Meter boards.....	22	1.17	25.67	1.67	36.67
Cable supports, 3 in., 3-wire.....	6	0.58	3.5	1.5	9.0
Remove 500,000 Cm. cable only.....	Ft. 1,200	0.3	40.0		
Install 500,000 Cm. cable.....	Ft. 1,300			0.88	108.33
32 ct. metering panel and cabinets, 200-A. sw. and 12 meter fuse branch.....	1	7.5	7.5	20.0	20.0
44 ct. metering panel and cabinet, 200-A. sw. and 12 meter fuse branch.....	8	8.67	69.33	24.0	192.0
48 ct. metering panel and cabinet, 200-A. sw. and 12 meter fuse branch.....	1	9.83	9.83	26.0	26.0
56 ct. metering panel and cabinet, 400-A. sw. and 14 meter fuse branch.....	1	11.17	11.17	30.5	30.5
Cable support boxes.....	2	0.5	1.0	1.0	2.0
3-in. conduit (old).....	Ft. 360	0.15	54.0	0.23	84.0
3-in. conduit (new).....	Ft. 30			0.23	7.0
3-in. elbows.....	9	0.67	6.0	1.67	15.0
Getting No. 14 wire out of way.....	350	0.55	192.5		
Cutting off branch circuit conduits:					
1/2 in.....	68	0.42	28.33		
3/4 in.....	34	0.42	14.17		
1 in.....	14	0.5	7.0		
Setting 48 in. by 15 in. by 8 in. splice boxes.....	11			3.33	36.67
Setting 6 in. by 4 in. by 4 in. splice boxes.....	1			1.17	1.17
Setting 4 in. by 4 in. by 1 1/2 in. splice boxes.....	10			0.58	5.83
Connecting branch circuit conduits to:					
splice boxes					
1/2 in.....	68			0.5	34.0
3/4 in.....	34			0.5	17.0
1 in.....	14			0.67	9.33
1 in. conduit.....	Ft. 520			0.1	52.0
1 1/2 in. conduit.....	Ft. 670			0.13	89.33
1 in. elbows.....	24			0.25	6.0
1 1/2 in. elbows.....	70			0.33	23.33
No. 14 R. C. wire.....	Ft. 18,500			0.007	123.33
Splices in splice boxes (No. 14 wire).....	700			0.17	116.67
Splices in basement pull box (500,000 cm.).....	12			3.33	40.0
Cutting floors and channeling fill.....	Sq.Ft. 58			0.67	38.67
Patching floor.....	Sq.Ft. 58			1.0	58.0
Miscellaneous labor.....				26.0	67.0
<b>Totals.....</b>			<b>557.83</b>		<b>1,411.17</b>

Time required for removing old material.....	557.83 hours
Time required for revised installation.....	1,411.17 hours
Time required for total revision.....	1,969.0 hours

# 4 Rules for Success

1. *Don't kid yourself about cheap materials—sell the best.*
2. *Give your old customers the breaks—they are your bread and butter, and positively your best salesmen.*
3. *Keep aloof of cheap competition—quality work survives the test and won't lower your reputation for reliable and lasting workmanship.*
4. *Never imitate "chain" selling methods or standards. Your experience and guarantees mustn't be reduced to the level of "5 and 10" clerks and their less serviceable materials.*

These are the rules laid down  
by

**Thomas B. Wise,**

*Proprietor of the Bradley Electric Shop*

WITH a background of over a quarter of a century in all kinds of electrical construction work, mainly tool work, Thomas B. Wise of the Bradley Electric Company, Council Bluffs, Ia., believes in always furnishing materials best suited to fit requirements, and properly installing them for permanence.

Being situated on the main business street of Council Bluffs opposite several large chain stores, a policy of retail wiring material sales was tried out by this company that would serve both those seeking cheap items and those who wanted more dependable materials. However, despite the adverse conditions in this community during 1934, the cheap lines were completely abandoned for the standard items of wiring materials.

Mr. Wise claims that there is a decided psychological advantage in firmly advising customers that for flimsy or less dependable materials they must shop at the "5



and 10" and let their own judgment be their guide. An example is cited of a lady who complained about socket trouble, claiming to have replaced two 25-cent sockets within the year. He offered a 45-cent socket which he would guarantee to operate a full year, otherwise he would replace it without charge. Another customer came in requesting a good socket from someone who knew what she needed, as she didn't believe in dealing with inexperienced clerks.

Sloppy methods followed by competitors in rendering service to business concerns, such as oil and gas stations and chain retail stores, served to point out the things to avoid if such good sources of business were to be cultivated. Lack of care in selecting materials, billing incorrect amounts, and inaccurate recording of labor charges appeared to present the principal reasons for acquiring new accounts that had been previously handled by competitors.

The owners of rental property have found complaint with the use of shoddy materials, and according to Mr. Wise, they are not inclined to follow lines of false economy, after carefully reviewing their maintenance records. Therefore, by constructive sales effort, stressing good materials that will be carefully installed at a fair cost, this class of customer has been won over and has been made an important market for small jobs at a fair profit.

"Be fair with your good customers," says Tom Wise, "give them your very best, and you will find that there are many friends who will boost you on to better jobs." Mr. Wise has been connected with the Bradley Electric Company since 1909, and is an active industry worker. He was chairman of the local administrative committee for the Electrical Contractors Code of the Omaha, Neb., and Council Bluffs, Ia., area.



# Reinspecting Small Jobs

## How Pittsburgh Gets Results

**I**F ALL the substandard, inadequate and hazardous small wiring systems of the average community were corrected during 1935, the volume of electrical work that would be required to complete this program would leave little complaint for lack of business. The correction of sadly neglected small wiring systems represents a great potential market to the electrical contractor, in return for which the public may enjoy all the benefits of greater convenience and less hazard. The principal difficulty lies in the lack of an effective program which will bring about such corrections.

While it may require a strongly organized campaign whereby a community would undertake a wholesale wiring modernization program, there are many reinspection opportunities which come to the attention of the inspectors in our various communities. The degree of their successful exploitation too often depends largely upon whether individual inspectors desire to go into detailed reports concerning such cases. Too many departments are lacking in a method of systematic follow-up or control of field production to enable their actual results to be kept clearly recorded. Consequently too few jobs are followed up or properly recorded for a future re-check.

Some of the varied opportunities for reinspections of small risks are the result of fire reports, reconnected premises, miscellaneous violation reports, bootlegging tips, evidences of remodeling, etc. Since the source of such information varies somewhat as to its origin, a divisional arrangement of the follow-up records for this work makes for greater clarity and simplicity.

In Pittsburgh, Pa., the division of wiring, Bureau of Building Inspection, follows a system which makes possible the close supervision of small job reinspections until each case has been finally disposed of. In addition to the general procedure for regular wiring permits, separate records and follow-up methods are employed for (1) inspections of vacated premises before utility meters are reinstalled, (2) special investigations of miscellaneous complaints or reports from the public, and (3) conditions found by individual inspectors and cited as requiring correction.

Through an arrangement with the Duquesne Light Company of Pittsburgh a reinspection is made of all systems from which a meter was previously removed, before a new meter is set. A flat fee of 50 cents each

is paid to the inspection department by the utility for all such inspections rendered each month, these inspections being authorized daily by mail upon separate utility order forms. Any unsafe conditions found to exist upon the wiring system must be corrected and approved by the inspection department before meter service is established. It is reported that this work involves up to 500 orders per month, and results in the repair and replacement of considerable defective wiring, sockets, etc.

The effective control of such work involves a triplicate form similar to that of the utility company. A white original approval copy is sent to the utility after conditions have been found or are made satisfactory. A yellow duplicate is used in auditing monthly charges, while a blue triplicate becomes attached to and filed with the original utility order for future reference.

The conditions that may be observed in the inspector's daily field work offer unlimited avenues for reinspection effort. A damaged service entrance conduit, a faulty sign connection, some hazardous cords in a window display, all or any of such visible conditions provide a legitimate reason for then and there making an inspection of the entire premises. A "cold canvass" with no immediate evidence of unsafe wiring as an entering wedge makes for slow progress, and sometimes creates mistrust in the mind of the occupant.

A definite notification procedure is carried out at the same time, in order that the psychology of correction



1—Utility order for city inspection of vacant premises.

2—Department approval certificate for utility.

3—Violation notice form.

4—Special investigation order form.

Electrical Inspection Department Staff—Frank J. Walsh, chief inspector, at extreme left.

*Electrical Contracting, June 1935*

orders shall bear its full effect. Likewise a written office record which corresponds with the notice given to the occupant permits the matter to be intelligently discussed in the office or by telephone by anyone. Such a system is particularly helpful during the illness of inspectors, at vacation time or if layoffs or staff work-sharing schedules are followed.

Each inspector of the Pittsburgh department carries a bound pad of triplicate reinspection forms upon which detailed violations are listed as found. The white original is given to the occupant with a definite time limit noted thereon for correction, while the yellow duplicate is submitted to the chief inspector for his daily follow-up record. The triplicate copy remains in the inspector's book as his own record. If no action has been taken within a reasonable time, or where the owner must be notified separately from the tenant, a letter is written in accordance with the report submitted upon the inspection form. The chief inspector's follow-up copy is retained as a separate convenient record until it has been reported completed by the inspector, with the correction permit number clearly designated thereon.

A majority of the special investigations, according to Frank J. Walsh, Chief Electrical Inspector of Pittsburgh, are reports from cranks, while others involve

spite work and many are from contractors seeking to create a job through condemnation. Then there are the lease breakers, business rivals, etc., many of whom send in anonymous complaints. It is important that the identity of complainants be kept in the strictest confidence; also that such investigations be reviewed by the head of the inspection department before an assignment is made. These orders are therefore issued in duplicate to the chief inspector, who keeps the original and submits the duplicate to the investigator, after first having removed the upper part of the inspector's copy, which contains the name and address of the complainant. The inspector is definitely responsible to make a report, since the original copy of each complaint investigation order is retained in the chief inspector's follow-up file.

All transactions of the inspection department employ the use of written order forms including copies which the chief inspector may review at all times. He can thus arrange the follow-up copies as desired and check the production in any district. Moreover, there is no excuse for the misplacement or neglect of a specific assignment on the part of an inspector. The details of many small operations are, therefore, kept moving along in an orderly manner, together with the regular calls for inspection of new work.



## Showmanship is Salesmanship

by John Wise

**D**URING England's Feudal Era, whoever was King had to do a lot of scrapping to keep the Crown on straight, and depended a great deal on that class of hired fighters known as "Free-Lances." These birds really did most of the fighting, but, being all action and little talk, were treated with indifference. When a civil war was finished, the regular troops got all the orchids. That the Free-Lance industry finally rose up and stole the show was due to the example set by our old pal, Sir Maurice de Bracy, the greatest money fighter of them all.

The biggest asset Maurice had was showmanship. His red-hots were not only smart battlers but well-dressed, well-fed and highly disciplined. They had the finest arms and horses money could buy. De Bracy's marching-song, like his blood-chilling battle-cry, was different from any other. Even his bugle-call was unique—King John called it: "The sauciest blast in all Europe." And enemy survivors of his raids, if any, always found the Master's trade-mark in the ruins of their fort or castle—a black glove, pinned to a beam with a golden dagger.

Naturally, the wise Free-Lance commanders copied de Bracy's system; dolled up their men, bought new equipment and hired minstrels to yodel songs of their victories far and wide. No longer were they high-hatted, even the belted knights of King Richard dipped lances to the boys who fought by contract. Every noble who expected trouble wrote on his cuff the phone number of the nearest Free-Lance headquarters; soon there was a waiting-list of customers.

Showmanship is merely super-salesmanship, and we need it badly right now. We have done most of the fighting, but not nearly enough promoting.

The electrical contractor who gets ahead is the one who makes his outfit known and respected by the public. He has neat workmen, sometimes in uniform. His cars and trucks are gaily painted and tell his story with a slogan. His advertising identifies him with efficient installations and fair-dealing. He puts signs on his jobs and labels on the services. In short, everything he does says: "I am a specialist and an expert; I can do your work better, faster and more economically."

That's **SHOWMANSHIP!**

# Cellular Steel Floor Wiring Methods

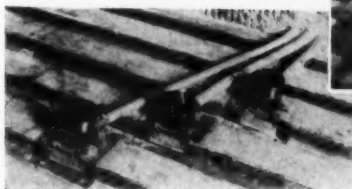
By Benjamin Bierman

Jandous Electric Equipment Company, Inc.,  
New York City

**A** NEW \$500,000 building for the Gallinger Hospital at Washington, D. C., is being wired to utilize a new type of cellular steel plate floor construction for wiring ducts or raceways. This construction method is known as the Robertson Steel Floor System, and it was used in the principal portions of this building's 68,000 sq. ft. of floor area. This system provides a series of parallel keystone-shaped steel cells on 6-in. centers, each about 6 in. high and  $3\frac{3}{4}$  in. wide.

These cells were generally selected in adjoining gangs of three for enclosing rubber-covered circuits to supply: (a) all 110-volt wall receptacles and night lights; (b) nurses' call system; and (c) radio and telephone systems. Except for such occasional cells as are blocked by riser pipes, concealed floor raceways may be had as needed at 6-in. intervals. The home runs come into the floor cells at right angles through cross-over ducts. These ducts are made in 6-in. lengths, thus each unit equals the overall width of one cell. Slots are cut into the steel floor by the flooring contractor to establish the exact route of cross-over ducts. That section of cells above the web is cut away, for replacement with either solid-bottom duct units, for cross-over use, or open bottom duct units comprising a floor fitting, for access units. Since both types of units are thus fitted into these cross-wise cell-slots, they are practically flush with the remainder of the steel floor, except for an overlap upon the cell steel, and the threaded access fitting hubs that extend upward to the future finished floor. The general layout involved three parallel cross-over ducts; run lengthwise in the main hospital corridors, for providing cell connections to the three wiring systems previously mentioned.

With this arrangement it is possible to make future circuit extensions and install additional outlets after



Conduit is run from these three cell-to-conduit-extension fittings to three wall outlets, (a) 110-v. receptacle, (b) telephone, and (c) nurses' call. The conduit fittings have swivel bases to permit their hubs being pointed toward the stub-up location, to reduce bends in short runs.



A typical corridor layout wherein the cells are crosswise, and the three cross-over ducts are run lengthwise. Round fittings provide access from the finished floor to each cell. Each duct system is connected to each third cell, giving a series of parallel underfloor ducts on 18-in. centers for each of three wiring systems.

the building is completed, by cutting a hole in the floor, and inserting a fitting into the top of the cell.

Approximately  $2\frac{1}{2}$  in. of concrete fill was applied above the cells to complete the finished floor level. Wire lath and plaster ceilings were suspended below to provide concealing space for plumbing and other pipes. Overhead lighting, power, fire alarm, clock and feeder conduits were run in this furred ceiling space, rather than in the floor cells. Each cell has punchings at about 6-in. intervals for inserting "S-hooks" into its side walls, beneath the web. These hooks provide fastenings for metal lath and pipe hangers. Heavy pipe racks were, however, suspended with hanger rods, which were bolted through the double-thickness steel webs occurring between the cells.

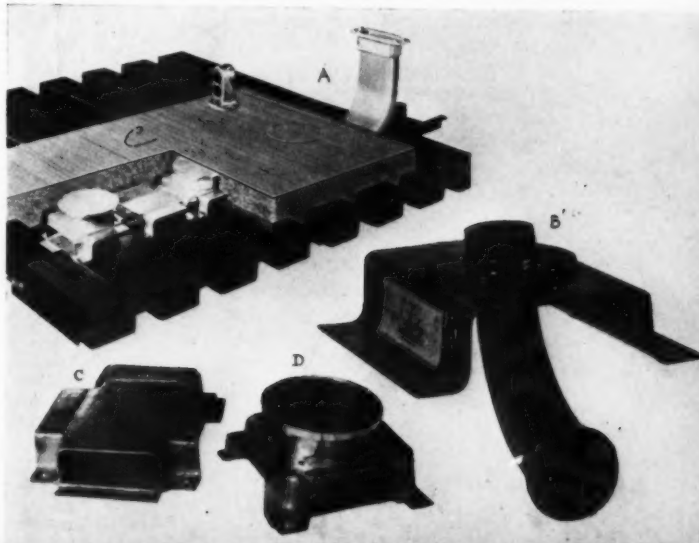
The electric wiring contract included furnishing and

A. This composite cut-away model is for a two-system layout and includes a floor receptacle fitting. Note that the center cross-over connection fitting has been lowered to conceal the access cover below the linoleum. The lower half of cell used on this job was deeper than this model.

B. A conduit-to-cell connection fitting used at end cells for stubbing directly into wall.

C. A blank cross-over duct unit.

D. Access fittings.



*Electrical Contracting, June 1935*



installing all fittings and boxes for extending the wiring from the floor raceways to receptacles, night lights, radio and nurses' call outlets, annunciators and panels. It also included the installation of cover plates over the cell joints, and other accessories such as identification markers, end fittings, etc. All joints, covers and fittings were also compounded during installation to exclude dirt and moisture.

### Sequence of Installation

The floor was pre-fabricated in 24-in. wide sections of four parallel cells, and in lengths to correspond with the spacings of steel supporting beams. These beams ranged up to 17½ ft. apart. Before any electrical work was started, the flooring contractor aligned and welded the sections in place to the structure. As this work proceeded the electrical contractor had to permanently cover and seal all welding access slots with blank steel plates and compound.

No attempt was made to pre-drill the cells, or to provide knockouts, for outlets, or fittings during fabrication. Instead the entire exposed steel floor was turned over to the electrical and other trades for installing their respective fittings and piping. All holes that were needed for risers which passed through the steel floor were cut or burned by the flooring contractor. Except for a few large pipes, these risers were centered in the web between cells. This minimized the blocking of cells with riser pipes to a large degree. The cells were drilled by the electrical contractor to receive the specific type of fitting required. Where spare access fittings are not now provided in the floor fills, such additions would involve drilling down into the floor to the top of the cell wall. An opening must then be cut in the steel cell to accommodate the floor fitting that is to be used for such additional wiring.

After all floor fittings, access boxes, cross-overs and risers had been completed, they were properly compounded to exclude dirt and water seepage during the process of pouring and finishing the concrete floor. The final work consists of wire pulling, installation of floor plates, access box covers, and wiring devices.

### Detail Operations

The first electrical operation involved the identification of all cells and the spotting of cell fittings. Each cell was painted at lengthwise intervals in a selected color corresponding with the system for which it was to be used. This avoided further delay during the installation of fittings in tracing out cell locations from the crossover connections.

The only openings provided in the cells by the factory were those provided for straight lines of access or crossover ducts. These ran in rows and at right angles to the cells and were equipped by the general contractor with temporary blank covers. These covers were later replaced by the electrical contractor with permanent cell-crossing raceway fittings, or cell-access fittings. This operation required holes to be drilled for securing the flanges of these fittings to webs between the cells. The access fittings were aligned for the entire length of each cross-over raceway by means of a tight line strung near the floor. After alignment and exact leveling, these fittings were finally secured and compounded to the cell surfaces.

An extension type accessible floor box from which conduit was run in the floor fill to the wall outlets was installed where the active cell did not occur directly under the partition. Another type of cell connection provided direct conduit-to-cell entrances from partitions. In addition to the installation of cell fittings, a series of round, square and hexagonal brass cell-identification marker studs were provided to finish flush with the finished floor in various rooms and corridors. These markers serve to identify the concealed cells for each wiring system, thus permitting future outlet locations to be readily determined.

The home run connection from panelboards and terminal cabinets were connected to the system with the particular fittings which were best suited to the conditions at each connecting point.

After all outlets and fittings were completely connected and compounded to exclude water or cement grout seepage, the completed area was ready for pouring floor fills.

Wire pulling operations are just being started. This is not expected to be materially different than for conventional pulling and finishing operations in other underfloor systems.

### Special Operations Required

Drillings were made by electricians in the double-layer steel web between cells for all fastening screws required for the fittings and boxes. Connections between the cells and the final outlets were made with several types of fittings and short conduit runs. This included the drilling or cutting of all fastening screw holes and cell-access holes. For fastening screw holes a ⅜-in. hole was drilled, which permitted self-tapping screws to be used instead of machine screws or stovebolts and nuts. The circular openings required in the tops of cells at all points where cell-to-conduit fittings occurred, were made with slow speed electric drills and circular saws. Each such fitting involved four screw holes and a 2-in. diameter cell opening.

Another important operation consisted of leveling the tops of the cross-duct to cell fittings to the finished floor level, and the final installation of permanent removable access covers to replace temporary covers that are provided for these fittings.

It must be noted that each third cell of this 3-system layout was provided with a cross-over duct connection fitting to its particular duct. The access cover plates, however, were left exposed in the linoleum floors only at those points where the particular cell access fitting contained spliced wires. Spare or vacant cell access openings were left concealed until such time as needed, at which time they may be easily spotted and a circular opening cut in to the removable cover.

While the use of underfloor cells replaced a large amount of the branch circuit raceway this wiring method required an increase in the total electrical bid price of \$6,500, or 25 per cent, due to the detailed installation involved. This increase for the electrical contract was off-set, however, by a structural saving of \$18,000 in the total building cost, since this method of floor construction was reported to have reduced the designed dead load from 80 lb. to 45 lb. per sq. ft. Furthermore, this wiring system is extremely flexible to permit future changes or additions with very little disturbance to the walls or floors.



## WIRING CONDITIONS FOUND IN FACTORIES

### No. 7—White Metal Processing

**M**ANY plants date back to open-wiring days and are zealously guarding their remnants of wiring as if its antiquity represented sentimental or historical value. Nevertheless even the most stubborn opponents of industrial modernization have seen fit to add on in patches, as certain machine processes were spread into unwired portions of the plant.

Many of these patched-up conditions are wholly inadequate, and represent a barrier to providing even mediocre lighting values. The very nature of old frame structures, often spreading over extensive areas, makes the fire hazard factor an important consideration.

**1.** A two-h.p. single-phase motor was added for driving a lead pipe cutting saw. Armored cable is draped beneath the bench from the safety switch for a distance of 30 ft. to a spare lamp socket at the left. From the motor switch this armored cable is also run along the floor to the motor terminals in the center background. No fitting nor ground connection is provided at the motor, or at the socket connection. A box has been built around the motor to exclude the lead sawings which may be seen scattered on the floor.

**2.** This solder-wire drawing-press requires local lighting at certain im-

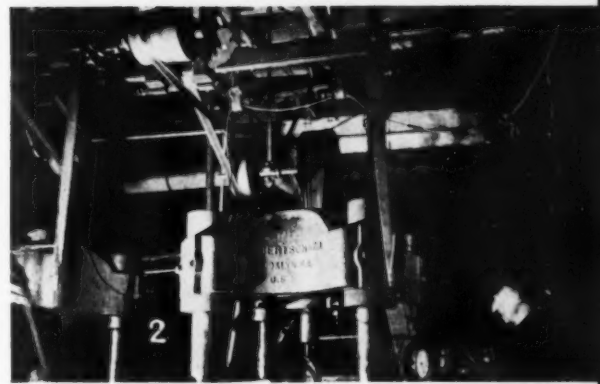
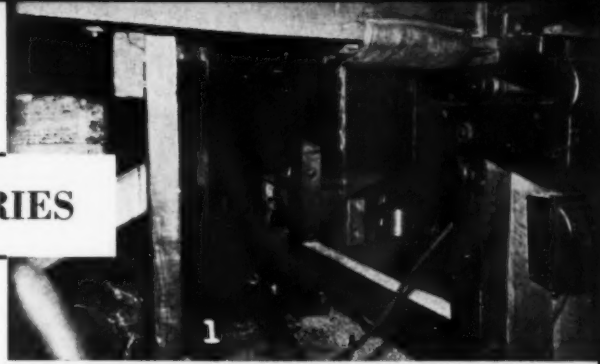
portant cylinder openings and gauges. This has been provided by draping cords about the machine with the main lead tapped to a handy drop cord.

**3.** Piecemeal attempts to correct old wiring have resulted in a general state of confusion. Armored cable has been added at places where runs of open sub-mains or branch circuits also supply certain original outlets.

**4.** This ancient motor control cabinet dates back to days when the starting of a motor was an event of special importance. The entire assembly is housed in a special cabinet which has a sliding

door that must be raised by means of a counter-weighted rope and a series of pulleys. The operator of this lead-pipe forming turn-table must perform these extra operations to control his motor, whereas modern control equipment would greatly increase efficiency.

**5.** Branch circuit fuse failures which result from cord or socket trouble often cause expensive delays in finding the fuse cutout. When found, such devices are usually in a darkened room or up on a high, black ceiling. Here a new circuit of armored cable wiring is tapped off and provided with a cutout cabinet between joists about 18 ft. above the floor.



# Construction . .

## Methods . . . .

### Removing Old Conductors

In re-wiring the Metropolitan Opera House, New York, N. Y., it was found that the old border-light circuit runs had become so thoroughly "baked" to their conduits that the hooks on a 2-ton chain block and  $\frac{1}{2}$ -in. steel cable straightened out before the massed conductors would give way. The E-J Electrical Installation Company's foreman therefore drilled holes in the elbows at the top end of each border circuit conduit riser. A quart of kerosene was poured into each conduit and left to soak for 48 hours. The conductors were then removed with little effort.

### Ground-Line Conduit Protection

In localities where the soil and atmospheric conditions cause service entrance conduits to rust away rapidly at the paving or ground line, there is a simple and inexpensive



method to check this trouble. An outer conduit sleeve may be installed on new jobs around the actual service conduit to extend above and below grade for 12 in. or more. The space between this sleeve and the conduit can then be filled and effec-

tively sealed with heated pitch. For existing installations which indicate a severe rate of corrosion, a split copper sleeve may be applied around the conduit after the required space has been dug away at the base of the conduit. A pitch seal will then check further corrosion. The above method is employed by the Stevens-Fitch Co., New Haven, Conn.

### Make-Ready Methods for Range Wiring

Flexible armored connections are required between the range and its receptacle under the wiring methods employed at Richmond, Va. Alex L. Bear, an electrical contractor of that city makes up that part of his range wiring jobs in the shop in lots of

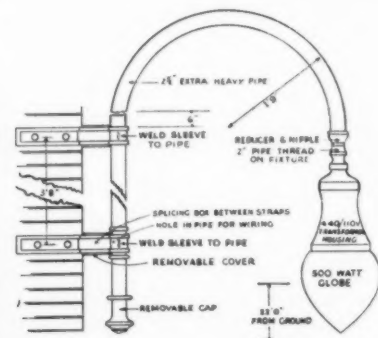


one hundred or more, in readiness for quick on-the-job attachment to the range terminals. These outfits consist of about 42 in. of flexible steel conduit, three conductors of proper length with their lugs soldered on, and the range receptacle plug, all connected up ready for use. Material waste is practically eliminated, since the flexible conduit is cut to exact length, while the wires are carefully cut by bench marks, to provide the right extra lengths in the range terminal compartments,

and for making up within the plugs. A considerable saving in time is effected because (1) a large number is made up in one continuous shop make-up and assembling operation, rather than one at a time out on the job (2) every item of material is at hand for easy handling, measuring and cutting, (3) a bench-mounted wire brush wheel is used for cleaning off the strands before soldering, (4) the torch flame is more easily kept adjusted for most efficient sweating-on of lugs, and (5) bench assembly permits quicker and more solid make-up of the mechanical connections between the conduit, connectors and plug.

### Yard Light Mounting Bracket

Areas between the various buildings of a large Peoria, Ill., distillery plant were to be lighted without taking up valuable ground space as would be required if the conventional street lighting standards were used. A light source was desired at street intersections which would direct a non-blinding beam.



Three-inch hollow steel goosenecks support the unit

To accomplish this the Dearborn Electric Construction Company of Chicago installed 500-watt directional globe units at the corners of various buildings, employing a  $2\frac{1}{2}$ -in. pipe gooseneck to extend the globe approximately 4 ft. away from the corner wall of the building. Two right-angle shaped flat iron brackets were formed to strap over the vertical portion of the  $2\frac{1}{2}$ -in. pipe, and were then welded thereto, spaced 3 ft. 8 in. apart. These brackets were bolted to the building walls, using four bolts per bracket. The strap loop or shank of the lower supporting bracket was provided with a removable cover splicing box between the pipe and the corner of the



Help your customers reduce  
the slice **STOPPED TIME** takes



The secret of Jefferson Super-Lag performance is in the lag plate on the Super-Lag link. This plate delays the normal fuse action, provides a time interval or lag by absorbing temporary heat rise. This time-lag prevents the fuse from blowing on harmless temporary overloads—saves needless STOPPED Time and link replacements.

Your customer has to pay his men whether they are working or are waiting on a STOPPED motor. Show him how he can avoid the many needless stops by using fuses which protect TIME, not just the motors.

Jefferson Super-Lag Renewable Fuses protect TIME. They do not blow the moment current rises—do not stop the motor if the overload is only temporary. But they operate positively before the actual danger point is reached. It is this "wait" which gives the motor a chance to recover speed—which eliminates needless STOPPED TIME.

Jefferson Super-Lag Fuses are made in both knife-blade and ferrule types, in all capacities to suit every customer's need. Liven up fuse sales by selling TIME protection along with motor protection.

**Fuse Chart—FREE**—A handy guide to selection of proper size fuses at a glance, for the adequate protection of motors. Ask for Fuse Chart No. 18.

**JEFFERSON ELECTRIC COMPANY**  
BELLWOOD (Suburb of Chicago) ILLINOIS  
Canadian Factory: 535 College Street, Toronto

**JEFFERSON**  
**Super-Lag** RENEWABLE **FUSES**



*One foot or A MILLION.  
One type or a dozen.  
ONE QUALITY in all.*

# CRESCENT

*insulated wire  
and cable*



**BUILDING WIRE  
RUBBER SHEATHED CORDS  
SIGNAL CABLES  
CONTROL CABLES  
LEAD COVERED  
VARNISHED CAMBRIC  
PARKWAY CABLES  
FLEXIBLE CORDS  
WEATHERPROOF WIRE  
MAGNET WIRE**

and all kinds of Special Cables to meet A.S.T.M., A.R.A., all R.R., Gov't and Utility Co's specifications.

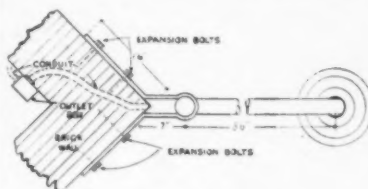
*All backed by*

**CRESCENT'S**  
**RECORD — "45 years**  
**of knowing how"**



**CRESCENT  
INSULATED WIRE &  
CABLE CO.**  
TRENTON, NEW JERSEY

building to receive the concealed conduit which was stubbed out of the building wall. A nipple connected the junction box to the 2½-in. fixture supporting pipe. This assembly was attached to the various buildings so as to place the lamp 22 ft. above the ground level, thus well above the

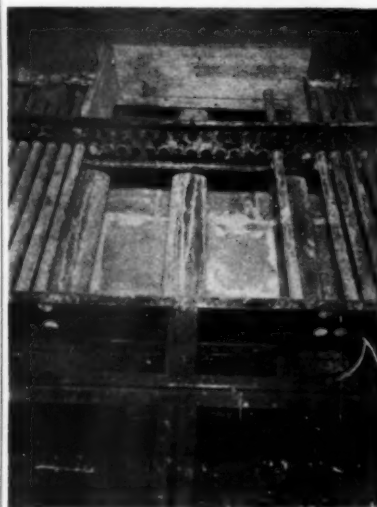


*Method of hanging*

sight line of street traffic. The size of supporting pipe as selected provided a neat and uniform appearance, as well as a rigid support for the special 440/110-volt transformer housings which were combined with the 500-watt globe holders. All of the supporting metal parts of this assembly were hot galvanized after welding.

## Spacing Overhead Conduit Stubs

Large groups of branch circuit conduits which stub down from high ceilings, may be kept in neat alignment above their panelboard and more definitely "fanned" out upon the floor form above by employing



steel spacing plates near the ceiling level. These plates contain holes for each conduit that are in alignment with the box drillings. When large numbers of branch circuit home runs are routed into panelboard closets from various directions they

must often be double-decked upon the floor and bent at awkward angles in order to provide clearances for feeder conduit risers. Considerable straightening-up labor is saved and likelihood of twisted-off conduits during form removal is avoided when each conduit is kept in its correct position during the floor-pouring process.

The steel plates are made up to match the panelboard box end-wall, usually of 16-gauge metal. The lengthwise edges are flanged down ¼ in. to provide additional stiffening so as to withstand the abuse which occurs during the removal of forms. The knockouts are provided to match those in the box below. This method is being employed by J. Livingston and Co., in the Italian building, Rockefeller Center, New York, N. Y.

## Locating Plugged Conduit In Concrete Floors

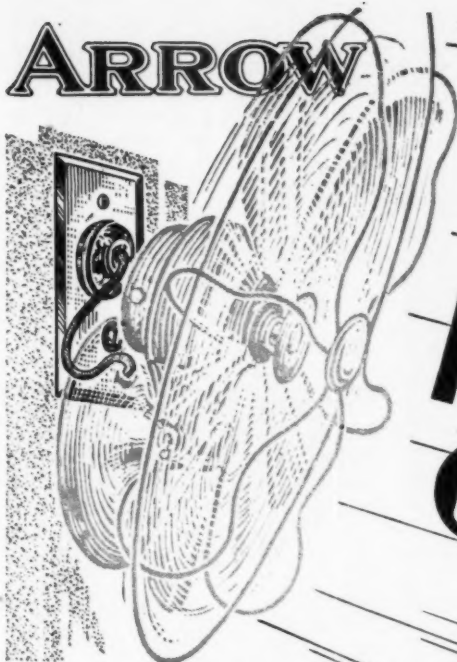
In pouring concrete in a large power-house, some conduits became plugged with cement. Since no one knew exactly where the pipes ran in the floors and walls, the problem was to locate them without digging up any unnecessary parts of the flooring. By connecting the electrodes from a welding generator set to the ends of the pipes and using an ordinary compass, the service department of the Canadian Westinghouse Company, was able to draw a chalk line directly over the pipe in trouble. Then a fish tape was used to measure the distance from the ends to the plugged portion, making it possible to break out the concrete directly at the point of obstruction. In spite of the fact that the pipes were 14 in. below the surface, half an inch or less deviation from the direct line could be detected by the compass needle.

## Water-Tight Conduit Riser Sleeves

Motor circuit conduits which must be stubbed through the concrete floors of wet working areas may be installed in a manner which will prevent water from seeping or running down the conduit to a floor below. In wiring for splash-proof motors in a dairy remodeling job, Louis Kalischer, Inc., Brooklyn, N. Y., had to provide floor sleeves at certain machine locations before the motor circuit sizes or routings were definitely known. These motors oc-



# ARROW



## FAN HANGER OUTLET

**Gives Speed,  
Strength and Beauty  
to the Wiring Job**

The **SPEED** of the simplest, easiest-to-install fan hanger. Fits in **STANDARD 4"-square outlet box**. The **STRENGTH** of a 4-point suspension capable of supporting a weight many times that of the fan.

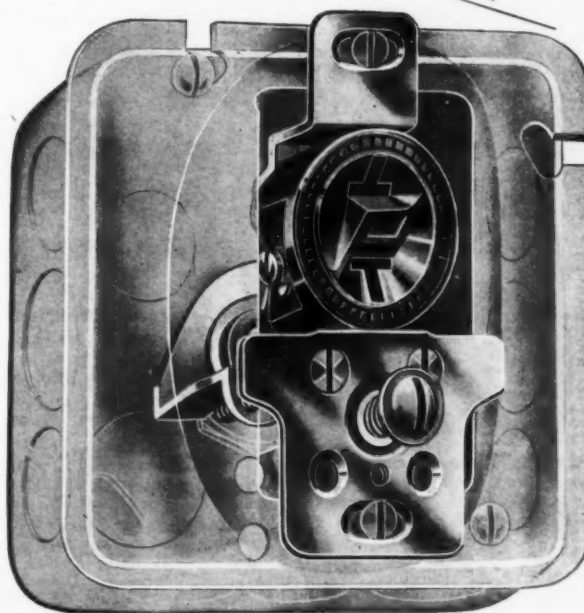
The **BEAUTY** of an all-BAKELITE Receptacle, with finding grooves to guide the plug prongs into the double-contact jaws. Heavy plate of .060 brass completes this attractive unit which makes such a quick appeal to your customers.

Price is extremely attractive to the Contractor; installation-cost surprisingly low. Standard package quantity, 20.

**For Stud Mounting—No. 7751:** Wireman twists hickey of hanger outlet firmly on stud of box. Inserts long holding screws into hickey; fastens to box cover; puts on plate; inserts fan screw.

**For Clamp Mounting:** No. 7750 includes clamp illustrated at right. Two fastening screws go in mounting plate and upturned lugs hold clamp firmly against box cover.

Data-sheet with complete listings for the asking.



**At right — Clamp  
for clamp mounting**

**Specify** { No. 7751—Stud Type  
No. 7750—Clamp Type



**ARROW ELECTRIC DIVISION**  
THE ARROW-HART & HEGEMAN ELECTRIC CO. HARTFORD, CONN.

**99 1/2 Years**


*of Experience Says ~*



New Type C  
**COLT-NOARK**  
Safety Switch  
575 Volt

**They Must Be RIGHT!**

When you install a Colt-Noark Safety Switch — you furnish your customer with a product that has back of it the experience, the ability and the integrity of a world-famous organization — whose high standards of quality have been recognized for nigh onto a century. Colt-Noark Safety Switches assure your customer of stand-out efficiency, because they are

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|--|--|---|
| <b>1<sup>st</sup></b><br><b>2<sup>nd</sup></b><br><b>3<sup>rd</sup></b><br><b>4<sup>th</sup></b> | <p>built and backed by a 99½-year-old organization.</p> <p>rugged from end to end — built for heavy service.</p> <p>a step ahead of the field in mechanical design and safety features.</p> <p>they have the quality you would expect in a Colt product.</p> |  |
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For rough, continuous and exceptionally severe service, Heavy Duty, Full Safety, Type A Colt-Noark Switches, dependable beyond comparison. For general all around service is exacting, and where continuous operation is new Colt-Noark Industrial Built for long and efficient standard H. P. rating for Switches are well made service or for small motor



by all means specify the They are rugged, safe, industrial use, where the order of the day, the



Type C Enclosed Switches are in a class by themselves, operation. Both Type A and Type C models carry motor circuit switches. Light Duty Type D Colt-Noark and especially adapted for lighting and disconnect installations not exceeding 2 H. P.

*These models are all described in detail in the new Colt-Noark Catalog 58-A — and also the complete line of Noark Motor Service and Entrance Switches. Send for your copy today.*

**ELECTRICAL DIVISION**

**COLT'S PATENT FIRE ARMS MFG. CO., HARTFORD, CONN.**

BOSTON      CHICAGO      NEW YORK      PHILADELPHIA  
Pacific Coast Representative, H. B. Squires Company

COLT-NOARK

SWITCHES - MOTOR STARTERS - FUSES

curred on a concrete upper floor where the machinery would be frequently cleaned under water hose pressure. This required the floor to be made water-proof before the machines arrived, so as to prevent water seepage or drippage to important lower floor areas. The conduit work was furthermore to be run on the ceiling below so as to be kept out of sight wherever possible in the machine room.

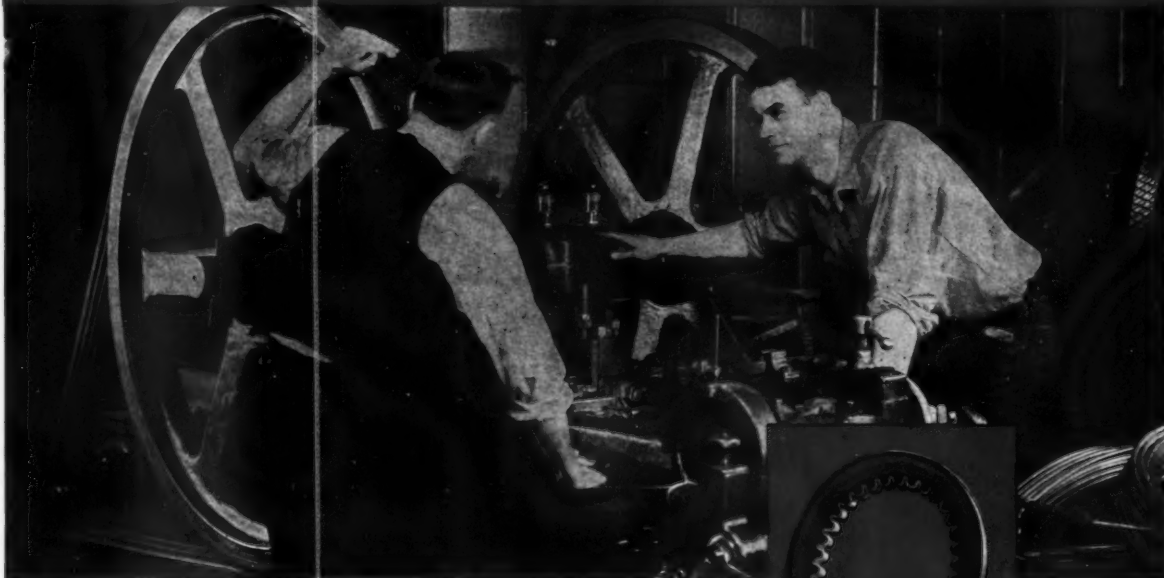
A 1½-in. conduit sleeve was therefore grouted into a hole which had been cut through the floor slab, this



sleeve being made long enough to extend about 15 in. above the finished floor. The ¾-in. motor circuit conduit was then stubbed up through this sleeve. A long running thread end was provided on this conduit to project above the top of the 1½-in. sleeve. This permitted the attachment of a 1½-in. to ¾-in. reducer coupling and a ¾-in. conduit coupling, for the continuation of this circuit to the starter. Before the fittings were made up, however, the space between the 1½-in. sleeve and the outer surface of the ¾-in. conduit was caulked and then poured full of water-proofing compound. The reducer coupling was then made secure to both conduits, after which the ¾-in. coupling was attached to receive the remainder of the circuit conduit run. This assembly excludes water which would tend to seep through such riser openings to a lower level.

# "We're putting DAYTON COG-BELT DRIVES on all of our machines"

SAYS ARTHUR F. WEBER • GENERAL MANAGER OF THE TRI-PLEX SCREW COMPANY OF CLEVELAND



"These drives have effected many real savings in our plant," says Mr. Weber. "Power savings—economy of operation—saving of valuable floor space—lower maintenance costs. Previously we had to overhaul machines frequently and change bearings. These drives cushion the shock of starting and operating the machines—then, too, they permit greater flexibility of operations, which saves electric current. Because of these savings we are changing over all of our machines."

In factories of all kinds, in fact whenever power transmission is used, similar savings are effected when Dayton Cog-Belt Drives are installed. The reason for the amazing performance of Dayton Cog-Belt Drives is found in the scientific construction of the Dayton Cog-Belt itself.

It is the only V-Belt specifically "built-to-bend." Its patented cog and laminated construction provides far greater flexibility... enables it to flex easily around even the smallest pulley without buckling or rippling.

And while it is more flexible, its laminated construction and patented reinforcement give it *extreme crosswise rigidity*. There's no squashing in the pulley groove... no distortion nor twisting. No other V-Belt combines such extreme flexibility with such positive crosswise rigidity.

But there are many more reasons why the Dayton Cog-Belt is setting new standards of performance in hundreds of industrial plants. Let us show you how it



● The only V-Belt that is specifically Built-to-Bend. See how the "cogs" take up the compression on the inner surface of the belt.

can save money for you in many ways—why Dayton Cog-Belt Drives are the most efficient drives in the world today. We'll gladly send you all the facts without cost or obligation. Write us today.

THE DAYTON RUBBER MFG. CO.  
Dayton, Ohio

*The World's Largest Mfr. of V-Belts... Manufacturers also of Dayton Fan Belts, Dayton Red Tube Radiator Hose and the famous Dayton Thorobred Tires and Tubes*

**Dayton**  
COG-BELT DRIVES

**Cog-Belt Drives—F.H.P. V-Belt Drives—  
V-Flat Drives—Complete Drives, Pulleys  
and Belts in Stock. Fractional to 100 H.P.**



# Service Shop...

## Practice.....

### Uniform Methods for Designating Elevators

A uniform code for designating the particular elevator of a group of two or more serving a building was found necessary in the repair shop of Warfield and Sanford, Inc., Washington, D. C. The confusion which can easily occur among employees in making repairs to the wrong machine is eliminated by a company rule that is posted in large lettering in its shops.

This rule reads as follows: "Notice! To distinguish the number of an elevator (where there is more than one car in a building) facing the hoistway, beginning at the left is No. 1. Follow this rule regardless of painted numbers on crosshead of car or certificate of inspection in car."

### Automatic Oven for Coil Drying

Automatic electric heat was adapted to an 8-ft. long, 57-in. high and 30-in. deep oven which is used in the motor repair shops of S. J. O'Brien, Inc., New York, N. Y., for drying out refrigerator units, coils, and general motor repair jobs. A



total load of 5 kw. is divided among five 1,000-watt, 120-volt strip heater elements. These elements are attached to the rigid angle iron floor structure of the oven with short pieces of perforated iron, so as to guard them against possible mechanical injury from equipment that is placed in the oven. A 3-phase 4-wire solid neutral feeder is used for the elements which is master-switched by a magnetic contactor. A thermostat at the top center of the oven operates the contactor coils.

Three fused safety switches are installed at the right end of the oven which provide sub-feeder control for phase "A," 2 elements; phase "B," 1 element; and phase "C," 2 elements. These switches each have an individual amber-colored pilot lamp at the top to indicate the number of elements in use for various oven-heat requirements. These lights are

only "on" when the main contactor is closed, and when that particular phase or control switch is closed.

An air compressor outfit is installed upon the top of the oven which produces 28 in. of vacuum and permits evacuating moist air from compressors or coils that are being dried out, by means of special tubing lines and connections inside the oven. This evacuation is claimed to lower the heat requirements and power costs, so that 185 deg. F. is the maximum temperature needed.

### Handling Tall Transformers

Repairing of tall transformers requires extra work in removing the windings from their cases, especially in service shops that have low ceilings. This condition was overcome by the Atlas Electric Company, Inc., Philadelphia, Pa., by installing hinged trap doors, made of heavy planking to fit flush with the second floor. Since the winding department is on the second floor, this arrangement allows the cores of large transformers to be easily hoisted from the first floor through this floor opening and moved along a trolley beam to the desired location in the winding department on the upper floor.

### Time-Saving Records for Small Motor Work

The Electric Refrigerator Motor Co., Philadelphia, Penn., specialists in reconditioning fractional horsepower motors, has a simplified routine which reduces clerical and shop detail and keeps it possible for a large volume of such work to be handled with a minimum amount of error.

A four-part perforated identification and work order tag is attached to each motor that is brought into the shop. This tag has a job number printed on each part. The lower end of the tag is torn off and becomes the customer's claim check. The next upper portion of tag becomes the shop repair record. Since only small motors are handled, this section of tag becomes checked as each repair operation is performed. Meanwhile the next upper section of the tag, bearing the customer's name is kept in the office until the "completed operations" record clears to the office. The two forms, which are

of exact size are then pinned together back-to-back. After billing is completed these two 4-in. wide, 3-in. high tag sections are filed away in numerical order. Future reference may be made to these work records from office copies of the customer invoices, which show the work order numbers for each motor.

Following the practice that is followed by watch repairmen, each motor frame is stamped before leaving the shop, showing the date of reconditioning. This saves time in checking up with customers who have a large number of motors repaired each year. If a motor is brought in which has previously been in this company's shop, quick reference can be made to the old work records from this stamped date reference.

Due to standardized repair operations, this company does not keep individual job cost records of each motor. Each item has been an-



# BULL DOG



FRICTION  
**TAPE**

**IT STICKS  
IT HOLDS  
IT LASTS**

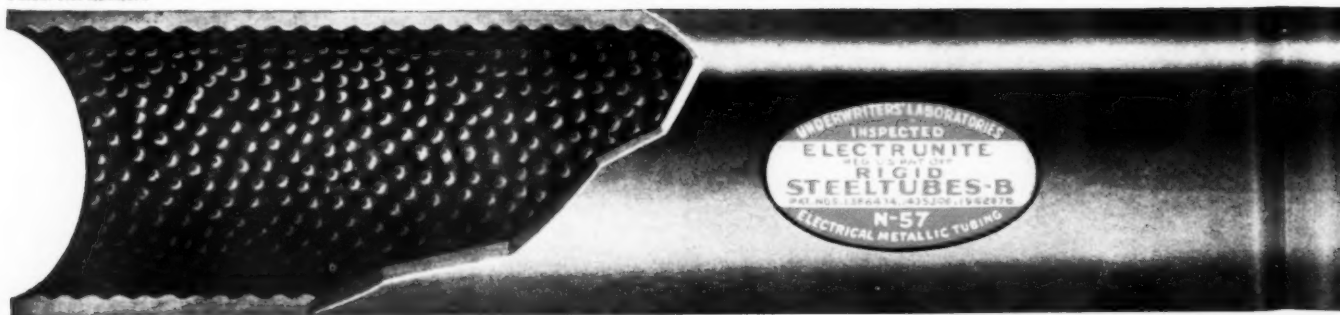
BOSTON WOVEN HOSE AND RUBBER CO.  
CAMBRIDGE, MASS.

# *It really costs LESS..*

**ELECTRUNITE**  
REG. U.S. PAT. OFF.  
**Steeltubes**



Patent No. 1,962,876



# ...and saves *MONEY*



● Despite implications to the contrary, Electrunites Steeltubes with all the necessary couplings and box connectors actually costs less than threaded conduit. The saving in first cost is approximately 5 to 15%.

But this is not the only saving made. Electrunites Steeltubes is much easier to cut and bend. It requires no threading. It takes up less space in walls and floors. It is approximately 30% easier to wire because of its patented new inside surface which cuts down friction. And in addition to these installation advantages, it affords perfectly adequate electrical and mechanical protection for wiring.

*Electrical Division*

## Steel and Tubes Inc.

WORLD'S LARGEST PRODUCER OF ELECTRICALLY WELDED TUBING  
CLEVELAND . . . OHIO

Contractors who are under the erroneous impression that this modern electrical metallic tubing costs more need only take prices on a single job to learn the facts. Any electrical supply house carrying genuine Electrunites Steeltubes will gladly give you comparative figures from which you can draw your own conclusions.

Knurled inside  
finish available  
in  $\frac{1}{2}$ ",  $\frac{3}{4}$ " and  
1" sizes



SUBSIDIARY OF  
  
REPUBLIC STEEL CORPORATION

# GREENLEE PROFIT MAKERS

## For The Electrical Contractor

THE greater the efficiency of the tools you use, the more chance you have of meeting competition and making a profit on each job. That is why Greenlee Conduit Benders and Knockout Tools are so popular. They cut costs on every job and are liked by the men who use them.



### Hydraulic Conduit Benders

Greenlee Hydraulic Conduit Benders insure profits, because they bend conduit quicker and easier than by other methods. In addition, they make smooth, even bends, eliminating many fittings and making it easy to pull in wire and cable. They are easy to take to the job, too, because they are readily portable.



### Knockout Tools

Greenlee Knockout Punches and Cutters are time savers and profit makers, because they make it easy to enlarge holes in switch boxes, cabinets, etc. They form clean-cut holes quickly and accurately, without any reaming or filing.

### Other Tools

Hydraulic Pipe Pushers  
Joist Borers Bit Extensions  
Electricians' Bits

Let us send complete information, without obligation to you. Just use the convenient coupon.

**GREENLEE TOOL CO.**  
ROCKFORD, ILLINOIS

GREENLEE TOOL CO.  
ROCKFORD, ILLINOIS

Please send complete information on the following:

☐ Conduit Benders  
☐ Knockout Tools

Name .....

Street .....

City .....

State .....

My Jobber is ..... 6-35

alyzed by time-studies and material-used lists, thus eliminating the need for such detailed clerical work.

For that reason it was possible to simplify the billing method by

Four-part work order tag

setting up a numbered code. In this code are the eleven principal types of small motor repair operations as follows:

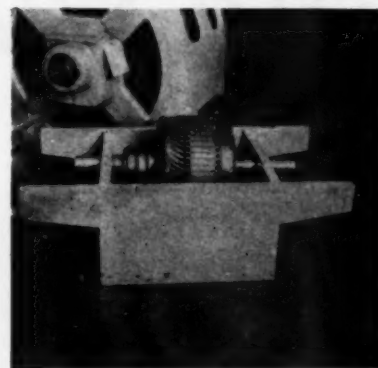
1. Replace Bearings
2. Rewound Armature—Balance—Install New Commutator and Shaft, if needed
3. Rewound Stator or Fields
4. Completely Rebuilt
5. Repaired Armature
6. Repaired Stator
7. Replaced Minor Parts
8. Replaced Major Parts
9. Repaired or Replaced Short Circuited Device
10. Supply Missing Parts
11. Resolder Armature—Re-Balance and Undercut, if necessary

Thus a motor which required new bearings, stator rewind and armature repairs would be invoiced for Nos. 1, 3 and 5. The customer has a price sheet showing the charges for each numbered operation. The sum of these numbered charges constitutes the total bill for that particular motor.

### Transport Cradle for Armatures and Rotors

Wooden boxes or cradles of various sizes, equipped with projecting handle bars are used by the Roland Electrical Company, Baltimore, Md., for transporting armatures and rotors. These cradles are made of 1½-in. material, have closed bottoms, and notched-in endboards to accommodate the armature shaft. A 1-in. flat iron retaining bridge is

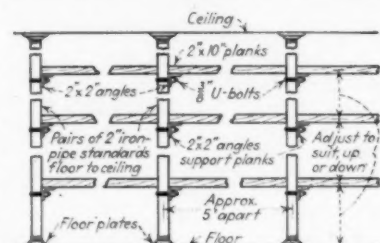
screwed down across the notches to hold the shaft in place, should the loaded cradle become laid on its side. This method protects the windings,



commutators or slip rings of armatures or rotors against injury during shipment, and while lying around a crowded shop. Likewise the handle bars project out far enough to guard the shaft from becoming battered.

### Adjustable Shelf for Heavy Materials

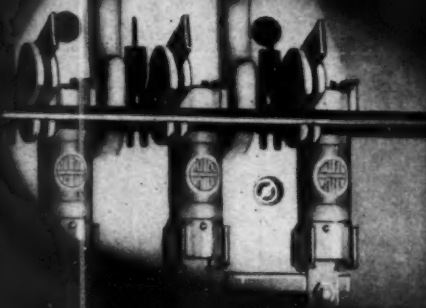
A practical design was developed for the heavy material storage shelves that are in use in the Charlotte Electrical Repair Co., Charlotte, N. C., by which a large number of heavy pulleys, starters, medium sized motors, etc., may be kept in an orderly arrangement in a relatively small floor area. By installing pairs of 2-in. pipe standards



to extend from floor to ceiling a rigid support is provided on about 60-in. centers for the attachment of 2-in. by 2-in. angle iron cross members, which in turn support 2-in. by 10-in. planks of lengths to suit the rack proportions. The pipe supports are equipped with threaded floor flanges at both ends, while the angle irons are fastened to the pipe with ½-in. U-bolts. The planks are then bolted to the angle iron with about 2 in. of space between adjacent members. The above assembly provides a rigid dependable support which is also adjustable from time to time to permit the shelves to be raised or



# CAN A WASHER BE IMPORTANT ?



**S**UPPOSE C-H does use higher quality fibre in switch hooks! Suppose those hooks are a better, cleaner die-cut job! Suppose they are more sturdily riveted, with strong rivets, and washers, too . . . What of it? Isn't that a minor point after all?

Possibly—when taken by itself.

And so it is with every other single thing in any switch.

BUT—the reason for whittling a C-H switch down to its details in this manner is to show that details, taken together, are all that matter; to indicate that quality must be in terms of details, and to show that the quality of the whole C-H line can be

proven in terms of any detail you may care to choose.

This, then, is not only an overall claim of quality and the acceptance that quality brings. It is a call to you to buy as C-H manufactures—on the basis that every detail is important, that when details are perfect the switch is perfect, and that such a switch is the best to buy, the best to sell.

Featured by alert contractors and independent electrical wholesalers everywhere. CUTLER-HAMMER, Inc., *Pioneer Manufacturers of Electric Control Apparatus*, 1306 St. Paul Avenue, Milwaukee, Wisconsin.

*The C-H line includes all types and sizes of Standard, Weatherproof and Explosion-Proof Safety Switches, and Meter and Range Switches for every locality—all built to the famous C-H Control Leadership standards.*



## CUTLER-HAMMER SAFETY SWITCHES







No transient ideal is the Memorial Auditorium in Worcester, Massachusetts—but a structure of enduring beauty—built

to pay homage to that city's honored heroes—who, in time of national stress, made the supreme sacrifice.

## THAT *Memory* MIGHT ENDURE

In building this great tribute to memory only the finest of craftsmanship and the best of materials were utilized. The utmost care was taken to assure perfection throughout and a most important detail was the insurance of the integrity and permanence of electrical equipment and circuits. To make certain of this—Amparak (intermediate performance grade) Electrical Wires and Cables—quality products of

the American Steel & Wire Company were specified. We are proud of the confidence thus bestowed upon us—just as we are proud of the unequalled record of service and performance that our Electrical Wires and Cables have established in every field of usage. We invite you to correspond with us—to take full advantage of the technical facilities maintained to serve you.



### AMERICAN STEEL & WIRE COMPANY

208 SOUTH LA SALLE STREET • • CHICAGO

*Offices in All Principal Cities*





# Code Chats.....

**Questions and answers relating to the interpretation of the National Electrical Code...**

**Conducted by F. N. M. Squires**

*Chief Inspector New York Board of Fire Underwriters*

## **Protective Devices for Sign Transformers**

*What is meant in 3803-d by "additional devices for the individual protection and disconnection of transformers in signs?" What would they be?*

*Would they be apt to be placed inside the sign? Should think they would be inside of the building so they would be accessible, as required by 806-g.*

Rule 3808-d prohibits a load in excess of 1,650 volt amperes being placed on one transformer. Under this rule, we might have a sign with five 300-volt-amp. transformers connected to a single branch circuit. It then might be desirable to provide separate protection for each transformer in order to localize trouble. These "additional devices," which may be fuses or circuit breakers, may then be placed within the sign structure.

If placed within the sign structure they would have to be accessible by means of hand holes.

## **Small Motor Protection**

*In the motor schedule for wire and fuse, or other protective device sizes, mention is made that motors of 2 H.P. or less may be protected by branch circuit fuses only. I have not found it permissible in either the 1931 or 1933 Code book. I would like specific data as to sizes or motors and range of sizes requiring single throw, thermal or double throw and compensators, and whether this data is in the Code. My information and practice is that double throw switches or thermal switches for starting include and start at 1 H.P. and compensators at 7½ H.P. in 3-phase circuits.*

Exception 1 of the rule 808-c says that "motors of 1 H.P. or less shall be considered as being sufficiently

protected by the automatic over-current protective device used to protect the motor branch circuit conductors \*\*\*." As motors of 1 H.P. or less may be provided with circuit conductors of No. 14 wire and these motor branch circuit conductors are, according to the table in rule 612, protected by fuses of not over 15 amp. and this Exception 1 rules that the protective devices protecting the branch circuit conductors are sufficient, then the motors are considered protected by the 15 amp. fuses.

In the 1930 Code the rule was in 808-a—Exception 1, and governed



**Leads Successful Durham Group:** Electrical contracting conditions in Durham, N. C., are pointed to throughout the states as one of the outstanding examples of harmony and progress. This reputation is largely credited to the trustworthy leadership of Wm. H. Clegg, of the Durham Electric Construction Co., who is chairman of the L.A.C., and always on hand to assist with any other activity which will bring about beneficial improvements in Durham's affairs. One of the recent Durham movements resulted in establishing a 60-amp. 1-in. service, and three No. 6 conductors and four branch circuits as the minimum standard for new residences of five rooms or more.

motors of 2 H.P. or less. This was changed in the 1931 Code to 1 H.P. or less and re-numbered 808-c—Exception 1.

The Code does not contain ruling as to the sizes of motors where single throw switches with thermal devices may be or may not be used, nor where double throw switches with compensators must or must not be used.

## **Range and Water Heater Service Sizes**

*There is some discussion between our lighting company and this department as to the size of service conductors for the installation of their ranges and water heaters. They contend that I am all wrong in asking for three No. 4 wires for one 9,000-watt range and a 1,500-watt water heater and two 15-amp. branch lighting circuits, the total capacity of 13,800 watts, my way of figuring.*

*The lighting company claims three No. 6 wires for the service are plenty large enough, and in asking for No. 4 wires hinders them from the sale of the ranges and heaters, as they must pass that cost on to the customer.*

The National Electrical Code calls for a demand of 80 per cent on the feeder supplying one range. This, therefore, would require on a 9,000-watt range connected to 110-220 volt, 3-wire circuit, a little less than 32.8 amp. capacity.

The 1,500-watt water heater, if connected up on 220 volts, would require about 6.8 amp. These two appliances together would then require 39.6 amp.


The No. 6 feeder has a capacity of 50 amp., which, if used with the above appliances, leaves available for lighting circuits a capacity of 10.4 amp. at 220 volts.

You are evidently figuring that each of the two 15-amp. branch circuits has a demand of 15 amp. While this may be theoretically true and, of course, possible, I think the actual conditions encountered should be considered rather than the possibility. This might be more or less insured by the use of 10 amp. fuses instead of 15 amp. fuses on the two branch circuits.

With consideration given to this, it would be possible to have sufficient capacity in a 3-wire No. 6 service.

If, however, there is a load of 15 amp. on each of the branch circuits and no provision made against using the water heater and the range at the same time then you would be correct in asking for No. 4 service wires.





# STOP!

## never dress the contacts of Bulletin 709 starters

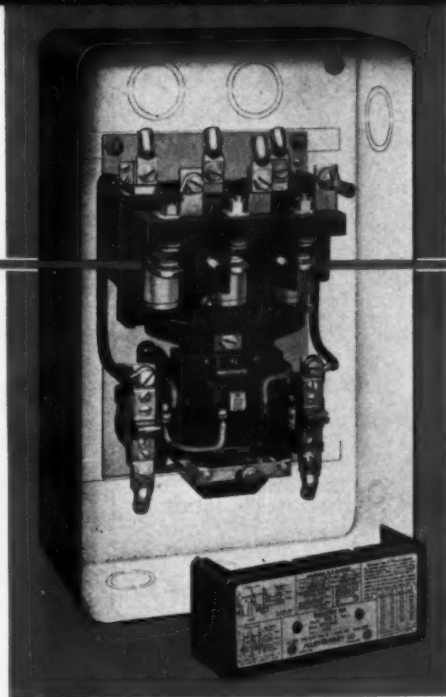
"Bunk!" says the maintenance man. "Contacts must be dressed once in a while."

But it's a different story with the Bulletin 709 starter—the silver-alloy contacts of these starters must *never* be dressed.

This is not advertising blah! It is true—every word of it. No insulating oxides form on Bulletin 709 contacts. The remarkably low pickup voltage assures instant starter action—without contact rebound—consequently no burned contacts.

Ten times maximum rated current at listed voltages is easily disrupted by all sizes of the Bulletin 709 starter.

There is generous room for wiring. All connections are accessible from the front. Slate and



molded panels are eliminated. The white Reflexo-finish of the cabinet interior reflects light and facilitates wiring in dark places.

The Bulletin 709 starter is made in three sizes for motors up to 30 H. P., 220 volts and 50 H. P., 440-550 volts. These same advantages are available as reversing switches, combination starters, multi-speed motor starters, etc. Every maintenance man should have information on the Bulletin 709 starters. Send for the bulletin and prices today.

Allen-Bradley Company  
1307 S. First St., Milwaukee, Wis.

## ALLEN-BRADLEY

### BULLETIN 709 SOLENOID STARTERS

# STEELDUCT CONDUIT



## STEELDUCT HOT-DIP GALVANIZED CONDUIT

The threads on STEELDUCT Hot-Dip Galvanized Conduit are protected with a smooth zinc coating, and in addition each length has an improved thread-protector that keeps the threads free from injury until the material is delivered on the job.

STEELDUCT Conduit is made from a special analysis mild steel pipe which makes it easy to bend and easy to cut and thread.

Use STEELDUCT and reduce your labor costs on your next job.

SD

*The* STEELDUCT Co.  
YOUNGSTOWN, OHIO

There is, however, on the market an arrangement whereby the water heater is only in circuit at off-peak times; that is, when the range is not in use. If such a device were used, then I believe that the three No. 6 wires would be sufficient.

### Motor Terminals and Enclosures

*Is it possible to develop terminals and enclosures for motors not requiring tape, and be more accessible on some direct connected motors to machines?*

There is nothing in the Code to require the use of tape unless splices are made and there is nothing to prevent the use of terminal blocks for motors provided a suitable housing is present which will properly enclose the terminal block.

Even if splices are made in the terminal housing, solderless wire connections can be used.

### Size of Common Ground

*Where a common grounding conductor is used, how is the size of the wire required arrived at?*

For this, consideration must be given to 908-a or b, 908-h, 908-k, and 908-l and the largest conductor required by these sections must be used.

### Adequacy Requirements

*What is the meaning in 2012-a of "Where sufficient branch circuits of appropriate capacities according to conditions as to their subsequent use that are likely to obtain are desired?"*

This is a polite way of saying that where an owner thinks so well of his home that he desires to have installed a sufficient number of outlets and receptacles that he may for the present and for quite some time into the future enjoy a sufficient adequacy of illumination and convenience he may do so by following the recommendations of 2012-b and c.

### Tube Regulating Coils

*What are regulating coils for gas filled tubes mentioned in 3808-e?*

Some types of gas tube lamps require the use of resistance or reactance in the circuit to limit the flow of current. These are also sometimes known as ballast coils.

NOW MAKE REAL *Money...*



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Electrical Contracting, June 1935

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# ELECTRICAL CONTRACTING

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S. B. WILLIAMS, Editor

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## **Morale**

WHEN a boxer stays to the finish against a stronger opponent, the crowd is with him. By his fighting spirit he has sold himself to his public.

The psychology of the prize ring is the same as that of business. A fighter will get the breaks if there are any to be had; but the fellow who has lost his morale will get no consideration.

There are times when it seems as though we couldn't take one more piece of punishment. But this is no time to quit. The sun is just beginning to come out. Conditions in the wiring business are now improving. It would be a shame after taking the pummeling of the last five years, for contractors now to give up.

Wholesalers and manufacturers will have less regard for contractors whose morale has been shot and by-pass them more. They will give them no consideration, because they will say those contractors are through.

It takes guts to come through a depression such as we have been through. It takes a strong fighting spirit to maintain one's morale. But it must be done. This is no time to throw in the towel.

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## **Opportunity**

THERE is an old adage that opportunity knocks but once, but it begins to look as though the electrical industry was a favored grandchild of opportunity, for again it is knocking on the door, and again—nobody is home.

June 15 is to be a big day in residential construction. Known as National Better Housing Day, it will be the time for launching model homes in every important center in the country. How many of these homes will be adequately wired?

In a few cities where there are active electric

leagues, an effort will be made undoubtedly to secure a good wiring job, but we venture to predict that not 5 per cent of all of these model homes will be wired to the industry's standards of adequacy.

This is but one more opportunity which the electrical industry muffs because it has no national organization of a promotional character. Again we say, we hold no brief for the Society for Electrical Development as it was organized. Nevertheless, this industry needs some national organization representing the entire electrical industry which will promote the wider uses of electricity.

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## **Farm Wiring**

WHEN the Work Relief bill, with its 100 million dollars appropriation for rural electrification was signed, the electrical contracting industry in the farm states saw an opportunity to build high-lines, and wire farm buildings. It now appears from the thinking of those in charge of the project, that very little, if any, of this work will be handled by an electrical contractor.

In order to make the money stretch over as many miles of line as possible, the standards of construction will be deliberately reduced from those found to be the best practice today. In fact, there is a possibility that the standards for house wiring will also be lowered, in order to do as many jobs as possible.

It will be the policy of the administration in charge of this project, to have the work done as far as possible by relief labor. It is obvious that electrical contractors could not employ that kind of labor, because of the uncertainty of its performance. Relief labor is to be employed even on house wiring, using a minimum amount of skilled labor for direction.

Although the farms electrified under this program will, for the most part, be those which would probably not be electrified by any other agency, we question the advisability of doing this work in a substandard fashion. While it is true that the development of telephone service in rural areas was frequently through the use of iron wires strung on fence posts and trees, it must be remembered that a farm can get along without a telephone, that no person or livestock is going to be electrocuted if a telephone wire blows down, and that no barn is going to burn up if the telephone wiring develops a fault. When a farmer

and his stock have to depend upon water secured by an electric pump, discontinuance of service can be mighty serious. Poorly constructed high-lines can hardly be expected to withstand storms. In view of these conditions, it is quite unlikely that any public utility will place itself in a position where it can be responsible for anything happening to the line or the customer.

It would not appear that this policy is one that would benefit the farmer, or promote the wider use of electricity. It would be much more to the point to have this money cover a smaller territory, but with standards of construction and workmanship that would reduce the hazards to life and property.

### **Representation**

SINCE 1881, when the first set of rules governing the installation of wiring was put into force, the insurance interests with the cooperation of the electrical industry have developed the National Electrical Code. Of late years the electrical industry has taken such an increasingly larger part in the revision of the Code that today, although the insurance inspection group continues to be represented, and although the National Fire Protection Association still sponsors the Code and names the chairman of the Electrical Committee, the Code is to all intents and purposes the property of the electrical industry.

How long will it continue as such?

A conference was recently held in Washington by a small body of men who hold important places in government bureaus, in national associations and labor, for the express purpose of discussing the advisability of establishing a federal electrical code to be administered by some government agency. It is of little importance that this conference was unable to make much progress in the establishment of a federal code. The important thing is that a group of men with important connections have challenged the present method of changing the Code, on the grounds of commercial bias made possible by unbalanced representation.

There are, of course, many obvious reasons why the electrical industry will want to continue to make its own code, but it should be remembered that after all this is a fire prevention code, and as such is written in the interests of public safety.

Even now it is frequently difficult to secure the passage of a local ordinance because of the charge that the rules are unfair to the public. How dif-

ficult would it be to thoroughly discredit the Code locally, if there were a concerted propaganda charging commercial bias?

The Code was not written for the purpose of preventing the introduction of new systems or methods in order to maintain the price of electrical installations; nor was the Code written for the purpose of legalizing any new method or system which because of its low price would serve to extend electrical service and increase current consumption. The Code was written for the sole purpose of surrounding electrical installations with reasonable factors of safety.

Is it not advisable then, for the electrical industry to give some consideration to its interest in the Code, and then lay down some policies which will make it more difficult for biased commercialism to guide Code changes?

A minority is protesting, the strongly organized groups can continue to ignore them, but it will serve to egg the minority on to more desperate efforts to federalize the Code.

### **Associations**

WHY do electrical contractors form local and state associations? This question is asked in all seriousness because of late we have noted the beginnings of local groups, some to accomplish a definite purpose, but others without any more definite program than just to organize.

When times are good, it is not hard to find enough contractors to kick in enough dues to keep an association going, but today the contractors do not have money to blow in just to be good fellows.

There are places where associations are making good, but those places are doing things with a program. There is no great difficulty to get money to carry on such work, even in these times.

Associations are good for nothing unless they do something. Just to band together and pay dues is worse than worthless, because it breeds discontent on the part of men who could and would be leaders. A few failures of this kind cause the industry to lose hope.

If those who believe in associations would first analyze their conditions, bring out in the light their problems and the reasons for their existence, and then map out a program, it is quite probable that they would be more successful. Also such a program must be in the interests of all the members, and it must be constructive.

As this issue was about to go to press, the decision of the Supreme Court of the United States declaring N.I.R.A. unconstitutional was announced. This space, which was to have carried the regular Code Authority News, has been placed at the disposal of Mr. Mayer, who, as

chairman of the late Code Authority, and president of the N.E.C.A., which sponsored the Electrical Contractors Code, is being looked to by the industry for guidance and advice during this confused period of retroversion to unregulated competition. EDITORS.

## Need for Self Regulation Greater than Ever

by L. E. Mayer

*President, National Electrical Contractors Association*

THE action of the Supreme Court in declaring the National Industrial Recovery Act unconstitutional and voiding of all codes and code administration, calls for clear thinking by all men. The sudden disorganization of code administrative forces gives rise to the danger of a return to former destructive competitive practices, unless each member of the Industry recognizes the serious consequences to himself if this should happen.

The Electrical Contractors Code provided rules of business conduct to give to each member of the industry assurance of fair competition. The removal of these Code regulations, because the Act which established them has been declared unconstitutional, does not change the need therefor.

The ruling of the Supreme Court does not affect the need for promoting organization of industry nor lessen the necessity for co-operative action among trade groups. It only increases the responsibility of industry itself to so organize that by co-operative action among trade groups it may attain those things which codes were designed to accomplish.

Outstanding among the benefits which the Code brought to our industry is the recognition by the Federal Government that the electrical contracting industry has a truly representative national organization, the National Electrical Contractors Association, representing an industry in which more than 16,000 industry members have registered under the Code and voluntarily acknowledged their responsibility to their industry.

It is a tribute to the character of our industry that in the short space of a few months after the Code was made effective on April 30, 1934,

it was possible through the national association to set up and make effective more than 350 code administrative committees, serving under more than 100 regional and district chairmen, and all acting in unison in carrying out the rules and regulations designed to maintain the highest degree of fairness for protection of individual rights. The Code has taught us by this medium to administer industry laws justly and fairly. It has shown us that unfair competition does not thrive when exposed to publicity.

The electrical contracting industry has been more successful than any other division of the construction industry in the administration of the Code. The reason for this lies within the industry itself, for the greatest influence in the successful administration of our Code has not come from federal enforcement but from industry acceptance and voluntary compliance. The spirit within the industry itself has made possible the many benefits which have been derived from the Code.

### Fair Competition Possible

This same spirit of voluntary acceptance of the principles of fair competition should not be lost because enforcement of the Code was not constitutionally written into a federal law by Congress. The same voluntary spirit and desire for fair competition can be made effective through industry organization under the leadership of trade association principles if the industry has the will to bring it about.

With the writing of the Code opportunity was given for us to recognize the mutual interests between employees and employers, which has developed a better understanding, a clearer vision and a more sympathetic viewpoint. Certainly this is

a relationship that we do not want to lose.

In our trade practice relations we stand today where we stood in 1930 when we voluntarily went before the Federal Trade Commission and drew up trade practice rules for our industry. Those rules, like the provisions of our Code, remain today as expressions of fair competitive practice which will always be necessary for the success of our industry. With the suspension of NRA it may be that we can again go before the Federal Trade Commission with a better plan of codified regulations.

This viewpoint is predicated upon the belief that our industry is in a position to regulate itself by self-government. It has already shown its ability to organize administrative machinery to make such rules effective.

It may be that the solution to future administrative enforcement of industry trade practice regulations will require a greater co-operation from State legislation. If that is so then we should promptly direct our efforts to that phase of the problem. It is important that State legislation be uniform throughout the country and to that end it requires national direction. The goal of trade practice regulation is the very life and business welfare of every individual member of industry. Obstacles do not mean defeat, where there is a will to reach the goal.

This is not the time to give way to discouragement. Every member of the industry who registered under the Code should now be turning towards industry organization through his local trade groups and national association. The National Electrical Contractors Association is earnestly planning an immediate program to meet the new conditions. Your enlistment in that program is urged.





THE MOST  
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*Motors!*

. . . . . you get more  
features with F-M Motors

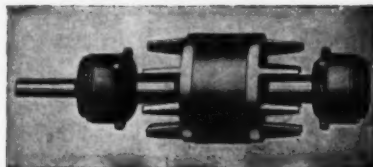
The best product wins! Today, purchasers are exacting—they scrutinize values. Features count heavily. The more outstanding features contributing to longer life, the better your chances of selling a motor.

You get more when you sell or recommend the installation of F-M Motors. A long list of F-M proven and accepted features substantiate your judgment in their selection.

These motors meet the most exacting electrical specifications. But with characteristic thoroughness, Fairbanks-Morse has achieved a position of leadership in mechanical construction.

Fairbanks-Morse pioneered mechanical excellence in electric motors. It pioneered ball bearings, grease tube lubrication, one-piece rotor construction.

Pioneers in motor building progress, Fairbanks-Morse asks only an investigation of how much more these motors have to offer. Start your investigations by writing for full information. Address Fairbanks, Morse & Co., 900 S. Wabash Avenue, Chicago, Ill.



Complete rotor assembly with cartridge-type sealed ball bearings. Note rotor winding is of one-piece construction.



Lubricate sealed ball bearings once a year with tube contained lubricant. Bearings, dust tight. No lubrication drip.



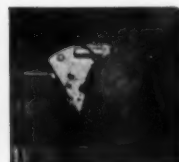
Group wound coils—an entire phase group in a single piece of wire—lead connections from each group welded, not soldered or brased.



Sealed-in leads through frame opening—anchored permanently. No chance for strain on field leads.



Slot insulation—self locking by means of cuff construction — permanent and additional protection for field windings.



Final vibrometer test—one of a series to insure a smooth running motor with minimum vibration.

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POWER, PUMPING AND WEIGHING EQUIPMENT

6085-PA40.51

Electrical Contracting, June 1935

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# Contracting . . . . .

## News . . . . .

### To Offer New N.E.C.A. By-Laws

The special committee engaged in revising the constitution and by-laws of the N.E.C.A., met in New York May 27. The new draft will be submitted to the convention to be held in Chicago in September.

The more important of the proposed changes deal with redistricting, greater responsibility upon the district committeemen, and the manner in which elections are conducted.

### Would Federalize N. E. Code

A conference called by the International Brotherhood of Electrical Workers on May 4, to discuss the advisability of creating a federal electrical code, and attended by a number of people in responsible places in the government bureaus and national electrical associations, went on record as endorsing the creation of such a code. The conference also endorsed in principle a plan to approach the American Standards Association with a proposal to "change representation on the Electrical Committee in such manner as to insure that the National Electrical Code be hereafter shaped after engineering principles rather than after commercial interests."

### Rural Electrification to Use Relief Labor

Invited by the National Grange, sponsors of the program, to speak on the "Farm and Home Hour," May 18, Morris L. Cooke, administrator of the Rural Electrification Division, discussed in general terms the purpose of his newly-formed bureau.

Stating that 86 per cent of the farms of the country are still without electricity, he named the states which have set up Rural Electrification Authorities, and indicated that through these agencies, and such others as might already be in existence in the rest of the states, he hoped very quickly to be able to set a program in motion.

Preliminary, however, to getting many projects actually under way, a

number of meetings have been scheduled with municipal and private utility operators, and the manufacturers of equipment that will go into electrified farm homes.

Labor for these projects will be drawn largely from relief rolls at wages set forth in the zone program announced by the administration of the Work-Relief bill, under which appropriation for rural electrification comes. Where the work requires skill, such as in house wiring, it is expected that men with a mechanical bent can be used under supervision.

The administration is convinced that a larger farm load than can be built from purely drudgery-dispelling appliances must be encouraged. For that reason water pumps will be pushed. There is every indication at this time that the sale of appliances will be on the T.V.A. basis.

### June 15 Better Housing Day

Ground for new model homes will be broken on June 15 in every community in the country that has a well-organized F.H.A. better housing committee.



**Installed Complete Electrical Restaurant:** Joseph Kirchner (right) and Z. A. Biggs, of Biggs & Kirchner, Inc., Washington, D. C., are quite proud of a recent all-electric restaurant wiring job. A 2,700-amp. load was distributed with seventeen panels. Large residences and special lighting jobs are also to their credit, such work including the interior floodlights for the Abraham Lincoln statue, by the banks of the Potomac.

It has been arranged to make this a national ceremony with radio broadcasts over a nation-wide hook-up.

In each community the one or more model houses will be built by a leading contractor under the sponsorship of the better housing committee, and efforts will be made to tie in the local house furnishings people.

Each home that is so sponsored must be so designed as to meet the approval of the committee from the standpoint of good construction. These homes will be widely publicized.

### Making Study of Motor Rewiring Prices

The National Motor Section, N.E.C.A., through its chairman, J. Roland Stolzenbach, of Baltimore, is making a nation-wide study of motor rewinding prices. The results of this survey are to be presented at the convention of the Association to be held in Chicago in September.

All service shops are asked to submit their rewinding price schedules as well as suggestions for further study and discussion to the National Motor section.

### New Jersey Industry Electrical Accident Report

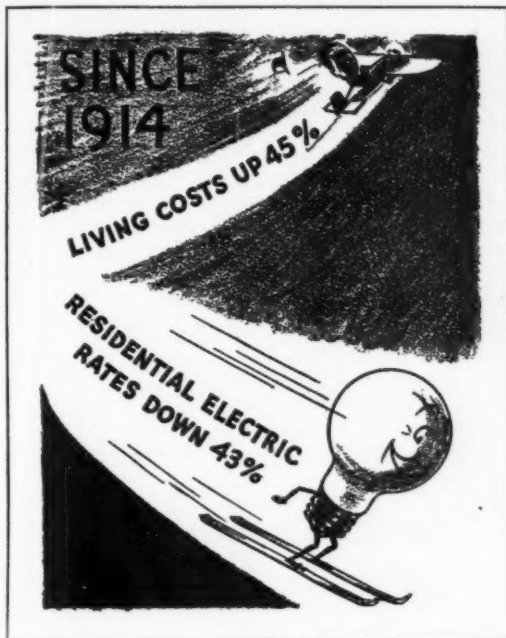
Electrical accidents occurring in New Jersey factories during 1934 are reported as involving a total number of 15,823 employee-days loss, according to the records of the New Jersey Department of Labor. Out of twenty-four case reports, ten were caused by short circuits or shocks; eight were caused by flashes or burns, while six were from operating switches. Two cases resulted in deaths; nine caused permanent partial disability, the balance being temporary disability. The total values of time lost are based on weighted figures of the state compensation laws.

### Philadelphia League Conducts Electrical Exhibit

The fourth annual exhibit of industrial and commercial electrical supplies and equipment, which is known as the Electrical Progress Exhibit, was held on May 14-15-16, at Philadelphia, Pa., under the auspices of the Electrical Association of Philadelphia. About thirty-three manufacturers were represented, each displaying and demonstrating their latest products for use in industrial or commercial uses. Attendance was reported by George R. Conover, managing director of the League, as exceeding the previous year by almost 25 per cent. Various wholesalers and contractors sent out printed invitations to executives and plant

# FACTS YOU SHOULD KNOW

about the job of serving the largest city in the world!



- We have 2,480,565 electric meters in homes, offices, and industries.
- 45,988 men and women earn more than \$78,000,000 annually working for our electric, gas and steam companies.
- Last year the Consolidated System purchased over 4 $\frac{3}{4}$  million tons of coal, over 9 million pounds of copper wire, and vast quantities of supplies of all kinds.
- Last year 681 miles of overhead wires were taken down and 1164 miles added to the 40,000 miles already underground.
- The capital stock of our company is held by 119,255 men, women, banks, insurance companies, institutions.
- The cost of living in New York City is 45% *higher* today than in 1914, but electric rates of the average residential customer have *dropped* 43%.
- Reduction in rates since 1931 represents a saving to customers of \$11,000,000 annually.
- The average residential bill in this city is \$2.45 a month . . .
- Last year the taxes payable by our companies to the City, State and Federal Governments totaled over \$40,000,000.
- It is estimated that more than 20 cents of every dollar we shall get in 1935 will be taken for taxes. Last year it was 18 cents. The year before it was 16 cents. In 1914 it was 8 cents.
- For unemployment relief other New York businesses are taxed 1/10th of one per cent of every dollar received. The Gas and Electric companies are asked to pay 3 per cent of every dollar received . . . a rate thirty times higher.

## THE ELECTRIC COMPANIES

AFFILIATED WITH THE CONSOLIDATED GAS COMPANY OF NEW YORK

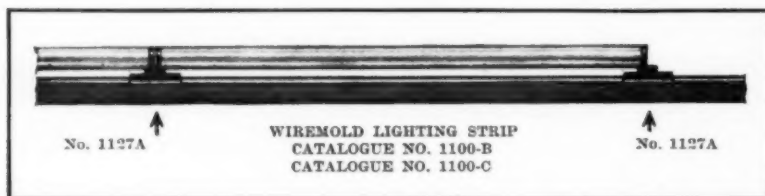


# THE WIREMOLD ZONE

THERE IS A WIREMOLD ZONE OF USEFULNESS AND PROFIT IN EVERY FIELD OF WIRING PRACTICE!

NUMBER 8 OF A SERIES ON WIRING OPPORTUNITIES

## Another WIREMOLD answer to the problem of LUMILINE LIGHTING

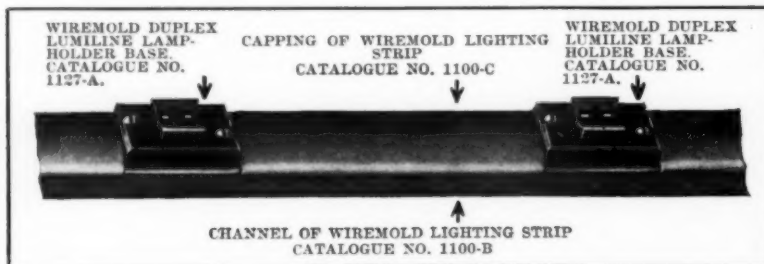


**"Slick!"**

*is the word for it—*

according to a lighting engineer

"Simply wire No. 1127A receptacles at proper distance apart and lay in channel No. 1100B. Turn two screws (with lugs) to lock each device into position. Then cut Snap-on Cap No. 1100C into lengths to fit spaces between devices, snap into position and job is done!"



*Send for special circulars showing how Wiremold simplifies Lumiline Lamp installations.*

**THE WIREMOLD COMPANY, Hartford, Conn.**



**Displays Wiring Relics**—Wooden fuse blocks made in 1882 are displayed on a plywood mounting board in the office of the H. W. Miller Electric Company, Omaha, Neb. These items were salvaged from one of Omaha's pioneer structures and attract a great deal of interest among the visitors to this company's quarters. The top device and also the third from top are front connected plug fuse cutouts, apparently made of maple wood. A cylindrical insulator of similar material encloses the screw shell contact, being turned out to an exact fit into the cutout base recess. The second cutout from top is provided with grooves for the main feeder connections to screw terminals. Branch circuit connection terminals are at the back of this latter cutout. Three samples of No. 14 rubber insulated wire in use 50 years ago are displayed near the bottom, above a wooden hinged cover enclosure for two 30-amp. solder wire fuses. Sheets of mica are provided behind each fuse link to protect against burning the maple wood base block.

staffs, while the general public was not urged to attend this specialized display.

### Camden Reduces Inspection Fees

A recently revised electrical ordinance passed in Camden, N. J., includes a reduced schedule of inspection fees. Where the former ordinance required a minimum inspection fee of \$2.50, the new minimum is now \$1.50. This change is expected to result in a greater number of permits being secured for smaller wiring jobs.

An electrical examining board of five persons has been created by this ordinance to pass on applications for master electrician licenses. This board is appointed by the commissioner of

*Electrical Contracting, June 1935*

YOU CAN FORGET  
*Expensive*  
 SERVICE CALLS  
 BECAUSE  
 SANGAMO  
 DOESN'T

When Sangamo engineers designed these

time-switches they didn't forget you. They knew

that the security of your profits on time-switch sales

depends on the consistent and accurate operation of

the time-switch. Therefore, only the finest materials, rigidly

tested and accurately machined, are used in Sangamo Preci-

sion Time-switches. Ask for Sangamos. Retain your profits.



FORM VIW  
 electrically wound,  
 with ten hour re-  
 serve period.



FORM K  
 synchronous time-  
 switch, three daily  
 operations pro-  
 vided.



FORM VS  
 synchronous time-  
 switch, omitting  
 device, also with  
 astronomic dials.

**SANGAMO ELECTRIC COMPANY**  
 SPRINGFIELD, ILLINOIS



**RUBBER  
ASTM  
AMAZON  
TAPE**

*rigidly tested  
..to give you better service*

**GraybaR**

EXECUTIVE OFFICES, GRAYBAR BLDG., NEW YORK

Victor [Friction and Rubber] and Sticka Tapes also Distributed and Guaranteed by Graybar

safety and must consist of two laymen, two master electricians, and a member of the Camden Electrical Bureau. The annual license fee is \$25.00, plus a \$200.00 performance bond.

#### Tampa Association Officers

The Tampa, Fla., chapter, N.E.C.A., has selected W. Monroe, president, and S. W. Shaw, secretary.

#### Youngstown Work to Contractors

Contracts have been placed by the Youngstown Sheet & Tube Company, with electrical contractors for substantial amounts of work in connection with their new project at Youngstown, Ohio.

#### Ralph Steffens

Ralph Steffens, manager of the Electric Association of Chicago, died on May 10, after an illness of several months.

A. A. Gray, secretary of the association, who has been acting as manager during Mr. Steffens' illness, will continue in that capacity.

## OPPORTUNITY for DEALERS

LINK-BELT makes available to dealers in certain territories a business opportunity such as has not been possible in a long time.

The market is at about 1% of saturation. All owners of heating or process steam plants up to 300-H.P. are prospects. With the larger jobs the fuel savings exceed the payments on the equipment.

The line is automatic under-feed stokers, in 13 sizes, built

and backed by a large old-established company, in business for 60 years.

Link-Belt finances deferred payment contracts for dealers, under a very attractive plan.

Advertising material, sales and engineering assistance given, plus cooperation on local advertising. Traveling representatives help you train men, close sales and survey jobs. Send the coupon for the complete story.



### LINK-BELT COMPANY

STOKER DIVISION

2410 W. 18th St. Chicago, Illinois

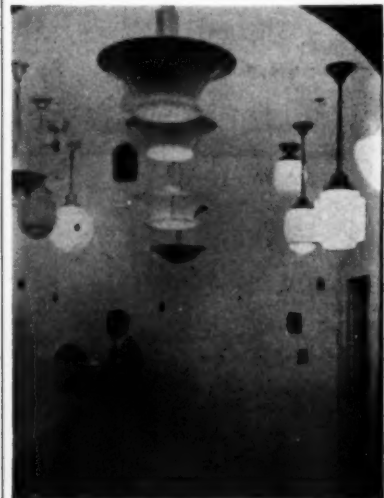
Send stoker book 1419 to:

Name.....

Firm.....

Address..... City..... State.....

Elec. Cont. 5215



**Adds Special Commercial Lighting Display:** Alex L. Bear, electrical contractor, has just completed a separate room in his large Richmond, Va., quarters, which features commercial lighting equipment, and comprises a total of twenty-four flush ceiling outlets in three rows, plus three wall outlets. Nine other rooms on this same floor are devoted to residential and institutional lighting equipment. This additional layout now provides 1,027 flush fixture display outlets, requiring 3,027 lamps. Approximately 75,000 watts in lighting load is consumed when all units are lighted. B. H. Caron, major appliance specialist of the firm, was inspecting an indirect urn lighting when snapped by the photographer.



# A Roll o' Tape

**Electrical Flashes  
gathered among the  
big wire and pipe men  
by  
Electrical Contracting's  
Field Editors**

**T**HE BEST wiring devices are good-will builders, believes Thomas W. Rakes, Rakes Electric Co., Roanoke, Va., who installs additional convenience outlets for several local appliance dealers—and guarantees his wiring devices for one year's service.

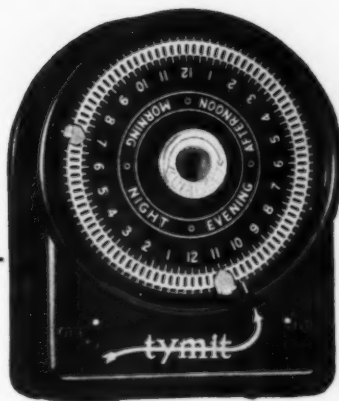
**L**ARGE jobs involve large risks, and also impose heavy financial burdens, therefore John C. Williams conducts his Hartford, Conn., contracting business to render good small job service. He finds time to take an active part in local industry affairs as well.

**W**HILE F. E. R. A. jobs have brought little solace to electrical contractors in general, the Perry Electric Co., Hartford, Conn., made their supervision services available in that city and sold the idea to the town fathers, too.

**Q**UALITY residence wiring could be expected when four reputable bidders from several cities recently quoted on a new rural Virginia home as follows: \$850; \$843.50; \$842, and \$840.50. Take your choice—all good firms.

**P**ROFITS from estimating—When F. E. Hartis, Modern Electric Co., Durham, N. C., gets the "rush act" for a bid, a hurry-up estimate is made first, but no bid is submitted until a detailed estimate is completed. The losses which are checkmated by "yielding not to temptation" warrant this consistent follow-through, says Mr. Hartis, even on surprisingly small jobs.

**C**ONVENTIONS which require special current facilities for the operation of equipment displays can be supplied on short notice by the Central



## I Am Mr. TYMIT

**I am a new type  
of time switch,  
offering a new field  
for merchandising,  
creating a new electrical  
business opportunity.**

**You can't afford  
not to know  
all about me—NOW.**

**The TORK CLOCK COMPANY, Inc.  
Mount Vernon, New York**

.....1935

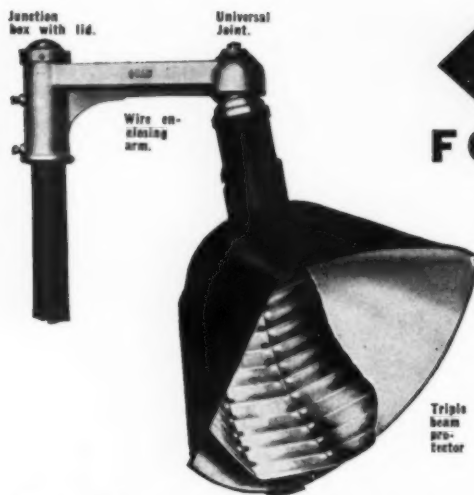
Please tell me how to sell Tymits, which I understand are high grade, electric clock driven switches and receptacles combined, in beautiful chrome and bakelite cases in Black or Walnut finish.

Please tell me what the portable plug-in Tymit does in the Radio field—Refrigerator field—the Burglary Protection field. Also about the rapid acceptance of the installed type Tymit in the Oil Burner, Automatic Stoker and Store Lighting fields. Also the prices and discounts.

Name of firm .....

Address ..... City ..... State .....

Jobber Reference .....



## QUAD FOR PROFIT

This is type J Bracket, a new porcelain enameled floodlight.

(1) The chromium plated projector delivers a longer, broader beam—without streaks or striations and (2) the aluminum wire-enclosing bracket puts the light just where you want it—with only one bolt to tighten.

It has a 40 deg. vertical adjustment, 20 deg. up and 20 deg. down, and in addition, for the first time, a horizontal swing of 180 deg. without moving the bracket.

Triple beam projector

## The Season for FLOODLIGHTING Sales is at Hand

The Quad line should be investigated by every contractor who is out to cash-in on floodlighting business. Write and let us send you full details.

Make the most of opportunity with Quad reflector units for outdoor floodlighting. Here is a line that delivers for you. There is a unit for every type of floodlighting correctly designed and built of materials that cause no after-installation worries. In other words the Quad line is today's modern one—designed in accordance with the user's viewpoint. Put your efforts back of this line and make installations that get full approval.

**QUADRANGLE**  
30 SOUTH PEORIA ST.

**MANUFACTURING CO.**  
CHICAGO, ILL.



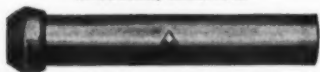
### For Residence Wiring

The Best and Safest Method is a properly installed KNOB and TUBE job. Be sure and get the

**Bull Dog**  
REGISTERED

Assembled Knob because it "HAS A GRIP LIKE ITS NAMESAKE."

**ILLINOIS ELECTRIC PORCELAIN CO.**  
MACOMB, ILLINOIS



## Subscribers

You can't afford  
to miss a single  
issue

Give us your  
new address if  
you have  
moved

Armature Works, Inc., Washington, D. C. Four integral motor-generator and converter sets, ranging from 5 K.W. to 30 K.W., are specially equipped for use on such occasions.

**E**LECTRICAL permits are recorded in a daily newspaper of Lincoln, Neb., showing the owner's and electrical contractor's name as well as the nature of work installed. No permit chiselling in Lincoln, it seems.

**E**STIMATOR Hint: It required 240 man-hours labor to connect and lace the conductors in eight separate wall-mounted border light cable terminal cabinets in a recently re-wired New York theatre. The terminals were used to splice the solid circuit wires to stranded multiple conductor cables, and involved 846 No. 10's; 32 No. 8's; and 76 No. 6's.

**M**OTOR service shop facilities can be very helpful to the construction department when difficult field problems arise, as for instance a recent bridge contract received by the Atlas Electric Co., Inc., of Philadelphia, Pa. The machine shop equipped a special lathe outfit for belling out the ends of about 40,000 ft. of 3-in. and 3½-in. tubing that this job required. Also special connectors are being made in the shop for this material.

**M**AINTENANCE service was canceled by an industrial customer of M. E. Arnold and Co., Philadelphia, Pa., claiming that a \$12.00 per month charge wasn't justified. A review of six months' repair items after this service ceased revealed an average increased cost of 500 per cent. F. L. Hess reports that his company has this customer back in the maintenance service fold.

**A**DEQUATE planning for the future load in newly-built homes was wholeheartedly supported by all the leading contractors of Durham, N. C., according to C. S. Whitaker, city electrical inspector of that city. As a result all new Durham homes of five rooms or more are being wired with a 60-amp., 1-in. service, three No. 6 conductors, and not less than four branch circuits.

**B**ID compilations occasionally offer some queer combinations. For instance, a residence wiring job for which twenty-one bids were deposited ranging from \$400 to \$1,300, was reported by a member of the Philadelphia L.A.C.

**E**XAMINATIONS for master or journeyman electrician licenses involve a thorough test in Hartford, Conn. Joseph P. Rowan, chief electrical inspector of that city, has equipped a large space with bench and wall

equipment ready for hooking up various circuit combinations, meters, and remote controlled motors. This practical wiring demonstration is required of applicants in addition to a set of questions on Code rules and electrical problems.

**F**ORTY miles of No. 8 drawn copper, half of it below water level; a length of  $\frac{3}{4}$ -in. stranded bare copper cable buried in a creek bed; and a  $\frac{1}{4}$ -in. by 6-in. main bus 790 ft. long between towers, comprises the grounding system for the new WOR broadcasting station at Carteret, N. J. Altogether 14,000 welds were made in the entire station.

**T**HE contractors of Roanoke, Va., recently started installing ranges for their local power company on a rotation plan. The first lot of orders to be placed under this cooperative system was cheerfully undertaken by C. C. Coon of the Dowdy Electric Co.

**F**ISHING through mineral wool partition insulation is something to consider with extreme caution. A customer of the Byram Electric Co., Inc., Portchester (N. Y.), wanted a signalling push button in a certain spot in his home at any price, but without exposed wiring or damage to the wall finish. It took two days to get up to the outlet location from the ceiling below. A hooked snake wire was used to pluck away the bits of tightly-packed material until a raceway was finally cleared.

**V**IRGINIA schools were visited for a period of six months during 1934 by a state safety inspector who devoted fifteen minutes to discuss electrical safety in the home.

**P**IONEERING in coining trade names many years ago, Charles E. Tull of Philadelphia, Pa., received much credit for his originality in calling himself an "Electrifier." All went well until a service connection charge mix-up occurred between the owner of a Tull-wired home and the local utility. The owner sued Mr. Tull, claiming that this newly-chosen professional title implied a full obligation to "Electrify" free of any further cost to the home owner. Mr. Tull is now an Electragist.

**G**RAPEVINE routes of publicity derived from good lighting installations interest Ralph K. Robinson, president of the Robinson Electric Co., Charlotte, N. C. A recent nice order to provide adequate lighting equipment in a doctor's suite is claimed to have resulted after the medico's spouse obtained a permanent in a Robinson-



U. S. Patent No. 1,700,985. Approved, Underwriters' and Factory Mutual Laboratories. Recommended by National Electric Code.



Central National Bank Bldg., Richmond, Va.



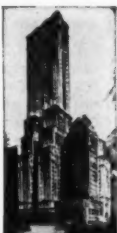
W. W. National Bank Minneapolis, Minn.



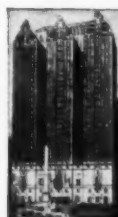
Fisher Bldg., Detroit, Mich.



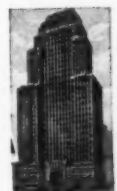
Philadelphia Fidelity Trust Bldg., Philadelphia, Pa.



The Lincoln Bldg., New York City



William Penn Hotel Addition Pittsburgh, Pa.



The Koppers Bldg., Pittsburgh, Pa.



RCA Building, Rockefeller Center, New York City

## PROVEN LEADERSHIP

### Wire Connectors of the *thread-on* type

In this type of Connector, which threads onto the skinned wires like a nut on a bolt, there is great opportunity for speeding up work—and lowering wiring costs. As no torch, solder or tape are required, countless trips up and down ladders are avoided—ceilings and walls kept clean. Strong and perfect electrical bonds are formed as the tapered entrance gathers and compresses the wires together, twists and threads them into a compact mass.

Electrical contractors prefer them for fixture hanging and roughing-in, electricians for making all types of small wire joints, appliance manufacturers depend on them for lasting connections, industrials for many wiring jobs. The millions used each year are outstanding evidence of proven leadership.

Send today, for free test samples of *thread-on* type WIRE CONNECTORS. Then make your own comparisons. Write any of the five manufacturers listed below.

BRYANT ELECTRIC CO. Bridgeport, Conn. GENERAL ELECTRIC CO. Bridgeport, Conn.

IDEAL COMMUTATOR DRESSER CO. Sycamore, Ill.

WEISS & BIELLER MERCHANDISE CORP., New York, N. Y.

WIREMOLD COMPANY, Hartford, Conn.

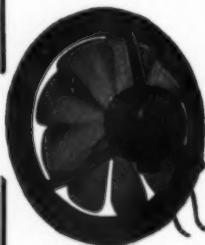
*A few of the thousands of large and small buildings where thread-on Wire Connectors were used for roughing-in and fixture hanging.*



## Keep your profit when you install BREEZO fans!

If you sell BREEZO fans, you enjoy one real advantage which outweighs many imaginary ones! When a BREEZO fan is installed, it "stays sold" and the contractor keeps his profit!

BREEZO contractors sell an all-steel fan—much lighter and stronger than fan with cast parts. Totally enclosed type



motors keep out dirt and moisture, and are large enough to operate continually without depending on artificial ventilation. Motors are very quiet. Bearings are extra large, bronze bushed with minimum shaft overhang. Waste-

packed lubrication, runs 1500 hours without reoiling.

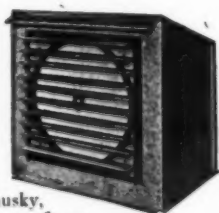
When you sell BREEZO fans—you sell satisfactory Ventilation—no expensive service calls.

### Use this table to figure required size: RECOMMENDED AIR CHANGES

In	Air Change Every
Residence Kitchens	2 minutes
Garages	5 to 7 minutes
Bowling Alleys	5 to 8 minutes
Paint Spray Rooms	2 to 3 minutes
Stores	5 to 8 minutes
Bakeries	2 to 4 minutes
Laundries	3 to 5 minutes
Billiard Rooms	4 to 8 minutes
Cigar Stores	5 to 8 minutes
Cremeries	5 to 10 minutes
Cleaning and Pressing Shops	3 to 5 minutes
Clubs	5 to 7 minutes
Restaurant Kitchens	2 to 3 minutes
Theatres	5 to 10 minutes
Printing Shops	5 to 10 minutes
Laboratories	5 to 10 minutes
Factories	5 to 10 minutes

**BREEZO Accessories are  
profitable, too.**

Where you sell ventilating fans, sell a louver or penthouse. Designed specially for BREEZOline, compact and husky, there is a nice profit on every sale. The whole BREEZO line is a profitable one. Can you afford to pass it up?



**WRITE FOR  
BULLETIN 2321-H**

**BUFFALO FORGE COMPANY**  
491 Broadway, Buffalo, N. Y.

lighted beauty parlor. The wife sold the job to her doctor-husband for Ralph Robinson. The business value of good lighting in her husband's offices was based on the wife's pleasing reaction to eye comfort in the aforementioned beauty parlor.

**B**ANK protective and alarm equipment is a specialty with the Brueckmann Electric Co., of Baltimore, Md. A separate corporation was formed to handle certain manufacturing phases of equipment, which was developed by A. C. Brueckmann.

**F**OLLOWING up reinspection notices can be made a profitable business in the opinion of John J. Collins, Collins Electrical Corp., Norfolk, Va., if careful supervision is given to insure efficient production. His small repair jobs show a fair profit at a reasonable selling price, due to careful management of details.

**R**ADIO-WIRED buildings offer deluxe tenant facilities that are exceedingly popular and therefore should not be overlooked by engineers and architects, in the opinion of Stanley M. Cameron, H. P. Foley Co., Philadelphia, Pa. In addition to selling this idea for a large local office structure, he prepared several clauses for the tenant lease contracts which have protected the building against radio set annoyance. As a result, the tenants are using radios all over the building without complaints of excessive noise.

**P**HILADELPHIA now wishes to qualify as the "city of homes with bathroom heaters," according to George R. Conover, managing director of The Electric Association. Almost every new home now has one of these units.

**E**LECTRICAL inspections in a city of over 70,000 like Roanoke, Va., keep one man busy. However, W. W. Krebs, inspector of that city since January 1, also makes inspections over the county as an additional community service. The latter work is purely voluntary in the interest of good wiring.

**I**NSPECTORS can obtain adequate wiring layouts with surprising ease, quotes H. J. Flynt, for fifteen years the city electrical inspector of Winston-Salem, N. C. Personal calls on architects and owners of commercial buildings have brought results which speak for themselves. This, incidentally, eliminates the bitter struggle that ensues where the inspector must criticize a poorly wired inadequate job. "Nip your trouble in the bud," says Mr. Flynt.

Specializing in

### ALL THREAD CONDUIT

Made from Enameled Conduit. Standard sizes in stock—special to order.



### GALVANIZED CONDUIT REDUCER

A very useful fitting. All sizes from 4x3½ to 4x4 in. Write for complete details and prices.

**G WILLIAM**  
Manufacturing & Supply Corp.  
2647 East York St., Philadelphia, Pa.

### NEON?

COMPLETE PLANT INSTALLATIONS  
also SPECIALIZING in:

Electrodes	Neon
Elevation Posts	8-10 Gauges
Housings	Glass
Transformers	Pumps
G. E. Cable	Bombardiers
Mercury	Stop Cocks

If you are planning to install a Neon plant, or have any Neon problems, feel free to write R. A. Warren (internationally known as a pioneer in the Neon industry).

**CHICAGO ELECTRODE LABORATORIES**  
Dept. A-9 St. Charles, Ill.

### LESS DRILLING and

More Powerful Anchorage are important factors on every job that requires the fastening of Electrical Equipment to concrete or masonry—You get these advantages with



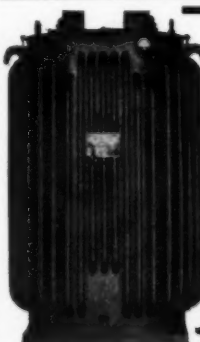
### CHICAGO EXPANSION NUTS

(Machine Screw Anchors) made in all sizes, long, short, and closed end.

Setting tools with every order.

SEND FOR FREE SAMPLES  
AND ATTRACTIVE PRICES.

**CHICAGO EXPANSION BOLT CO.**  
128 S. Clinton St. Chicago, U. S. A.



"Standardize on  
**STANDARD**  
Transformers"

ALL TYPES  
Indoor and  
Outdoor  
Service

Send for  
Descriptive  
Bulletin

**STANDARD TRANSFORMER CO.**  
Warren - - - - - Ohio

# New Products . for June . . . . .

## Trough Reflector

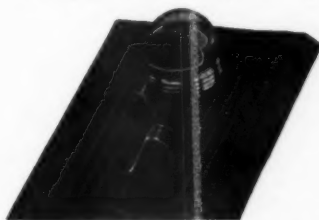
All-metal ready-to-install, trough-type window reflectors have been announced by the Garden City Plating and Mfg. Co., Chicago, Ill., and are known as the Gar-Ray line. The "Gar-Ray" reflecting surface employed in this equipment is claimed to be equal in efficiency to mirror glass, while also permanent, unbreakable and non-tarnishing. Specialized designs are de-



veloped to suit the specific size and type of window to be lighted, for either exposed or flush mountings. These units are available in various lengths with square or mitered ends, and are furnished completely wired. Several types of special features are also available, including longitudinal, crosswise or double louvers; and continuous, hinged glass frames.

## Night Light

A wiring device combination which fits a standard switch box and one-gang plate, and which permits adding a night light and switch at a single pole or three-way switch location without running any extra wires. This combination utilizes the "Despard" line of compact devices, thus permitting the



existing single switch box to be used. The night lights which may be added to either or both three-way switches, burn only when the fixtures are normally switched "off." Pass & Seymour, Inc., Syracuse, N. Y.

## Armored Cable

Eastern Insulated Wire and Cable Co., Conshohocken, Pa., announces New Process Cable, an armored cable which is claimed to provide a safer and more readily installed product. The armor strip is provided at the factory with impressions at convenient intervals along the cable. These impressions are made at a correct angle to act as a guide for severing the cable with either a file or

hacksaw. Only the exposed hump of the armor impressions need be filed or cut, thus lessening the likelihood of wire damage. Correct bending of the cut armor is claimed to sever the armor strip, leaving it free from sharp points, burrs and distortion. A continuous red



tape between the armor and the paper wrapped conductors is claimed to serve as equivalent bushing protection when wrapped around the conductor and pushed down under the armor. The free end of this red tape is left long enough to extend back beyond the connector to show its use as a bushing.

## Power and Lighting Plants

Smoother and quieter operating is claimed as a result of rubber-cushioned life-time mountings which have been designed for the Universal line of electric power and light plants. A patented feature employing the ball and socket principles is claimed to prevent the base of the unit from coming into contact with other metals or solids, lagging screws, floor bolts or even the floor itself. This mounting can be supplied as well for Universal units that are now in service. Any of the Universal plants from a one to six cylinder, air or water-cooled, from 330 watts to 50 k.w. can be rubber cushioned. Universal Motor Co., Oshkosh, Wis.

## High Speed Welder

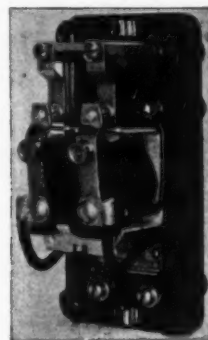
The Harnischfeger Corp., Milwaukee, Wis., has announced its P&H-Hansen 50-



amp. vertical model welder. The outstanding feature claimed for this welder, known as the W50-254, is the extremely stable high speed arc which enables it to weld quickly and efficiently down to 26 gauge steels. Being a motor generator unit with a 3 h.p. squirrel cage motor, it operates on any a.c. power line including 110 volt single phase. It requires less than 2 ft. of floor space, and is supplied with base for stationary mounting or with wheels or lifting bail for easy handling around the shop.

## Auxiliary Relay

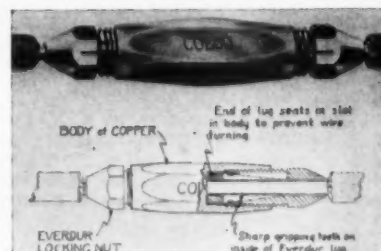
A small auxiliary relay for use on a.c., or d.c. is announced by Westinghouse Electric and Manufacturing Co., East Pittsburgh, Pa., in which each contact is claimed to be able to carry 12 amps. continuously or 20 amps. for one minute. The relay is available for mounting on steel panels or



for insulating materials up to 2 in. thick. A front-connected type can also be furnished. Both types have two independent contact circuits which are adjustable for circuit-closing or circuit-opening service and may be obtained for 550 volts a.c. or 440 volts d.c. circuits.

## Line Splice

The "Colco" mechanical line splice offers a simplified device for providing a strong



and positive splicing grip on either solid or stranded wire. A pure copper hexagonal body, Everdur lugs and tightening lugs are used, these being designed to be readily accessible for inspection. Ease of installation, high re-claim value, and trouble-free design are claimed. Splices are made for use with all sizes of both solid and stranded wire. Connect-O-Line, Inc., Chicago, Ill.

## Lighting Fixtures

Mercury vapor lamp fixtures, designed for general interior lighting and also for the more special lighting of high narrow

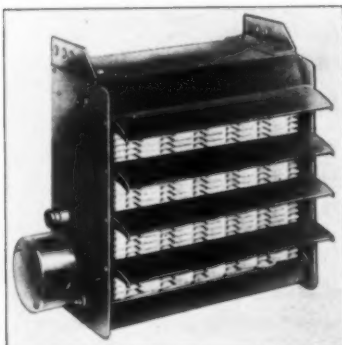
rooms. The fixtures use a 400-watt, high intensity mercury vapor lamp, and are made with aluminum reflectors in both concentrating and spread types, and with porcelain enameled steel dome-shaped reflectors for a broader distribution of light and coverage of both horizontal and ver-



tical surfaces. The "Turnlox" feature, which permits the removal of lamp and reflector as a single unit for easy cleaning on the floor or at a bench, is available with either type fixture. Benjamin Electric Mfg. Co., Des Plaines, Ill.

### Industrial Heater

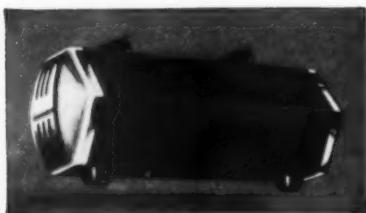
A line of Electromode industrial type electric heaters, designed for permanent installation upon wall brackets or for ceiling suspension is announced by the Electric Air Heater Co., Mishawaka, Ind. The heating unit resistance element is cast integral with an aluminum fin type of grid. The heat from the cast-in element is con-



ducted through the fin area and carried off by forced circulation from a fan which is mounted behind the unit. In case the fan motor should stop, an automatic switch disconnects the element circuit also. Each unit is enclosed with 18-gage furniture steel. Adjustable deflectors on the front permit the warm air to be directed where desired. Sizes range from 1.2 k.w. up to 60 k.w.

### Sign Transformer

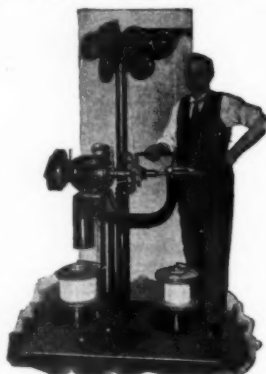
Series 728 indoor-use sign transformers are designed for installing in either a suspended or standing position. Porcelain



secondary bushings are provided to accommodate electrodes or cables without change or without splices. Cable anchoring clamps of new design are said to provide secure anchorage. The porcelain bushings may be adjusted to meet electrode centers, and glass tubes or metal shields can be used over the high tension cables. Service connections may be rigid or flexible conduit, armored cable, or cord and plug. A pull-chain switch is optional. A six-sided case, finished in black cracked art lacquer, also includes chromium end plates. The release of one end plate screw provides wide open access to the wiring compartments, thus allowing speedy connections. Jefferson Electric Co., Bellwood, Ill.

### Armature Winder

The P. E. Chapman Electrical Works, St. Louis, Mo., announces its 1935 model, style 20 automotive generator



armature winding machine. It is claimed to be two-thirds automatic, doing 90 per cent of the work of winding the armatures at a high rate of production. It handles all the big production numbers of automotive generator armatures, which are said to be turned out independently of the operator's skill.

### Chime Call

A line of Faraday bar-chime calls for use in place of bells or buzzers for residences, apartments or offices. Made in four general types: Bar-chime calls; bar-chime calls in combination with bells and buz-

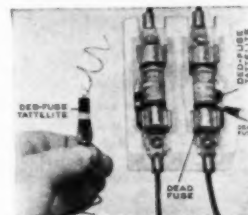


zers; tubular resonator chime calls, and tubular chime calls. Adapter plates are available for outlet box mounting, while numerous types include hollow, molded-edge mounting panels accommodating up to three units which are designed to cover rough or broken plaster, wire connections, etc. The mechanical parts and

binding posts are enclosed in duco finished covers of several optional colors, while the back plates have a standard ivory duco finish. Stanley & Patterson, New York, N. Y.

### Blown-Fuse Indicator

A small neon lamp indicating device known as "Ded-Fuse Tattelite" is claimed to tell instantly when and where a fuse



is blown. This device consists of a 1-in. long lamp and casing about the size of a pencil tip. Flexible leads 6 in. long are provided for connecting this lamp in parallel with any size cartridge fuse that is used in circuits of 100 to 550 v., a.c., or d.c. No current is drawn until the fuse blows, due to a built-in protective resistance. Other suggested uses include plug fuse cutouts, and for indicating open circuits, switches, relays, etc. The neon lamp is claimed to light on .0005 amps. Little-fuse Laboratories, Chicago, Ill.

### All-Rubber Cord

An all-rubber parallel lamp cord for small domestic portables has been announced by the General Electric Co., merchandise department, Bridgeport, Conn., in which both copper conductors are insulated simultaneously with a 1/32-in. wall of rubber. Known as type PO-SJ "Special," it is claimed to provide good insulation and abrasion characteristics and to permit easy separation of the individual conductor for assembly purposes. The cord has a series of longitudinal ridges in its outer surface for improved appearance, and is available in four standard colors—brown, ivory, black and olive.

### Industrial Reflector

The "Super-Lume" line of porcelain enameled steel reflectors for outlet box mounting is announced by Day-Brite Reflector Co., St. Louis, Mo. A reflecting diffuser is combined with an apron shade, the latter being enameled on both inner and outer surfaces. Light reflections which are directed upward around the neck of the lamp are diffused at various angles from the shade surface. Three types of mountings are to be had, all to fit standard 4-



in. outlet boxes. Ease of installation and maintenance and high efficiency are claimed.

*Electrical Contracting, June 1935*



## Trade Notes . .

Wolverine Tube Co., Detroit, Mich., announces the appointment of Robert G. Montgomery as sales representative in Maryland, Virginia, and the District of Columbia.

The Bright Light Reflector Co. announces the removal of its factory and headquarters to Metropolitan and Morgan Aves., Brooklyn, N. Y. These new quarters provide double the amount of space formerly occupied.

The Miller Co., Meriden, Conn., announces the re-location of its New York, N. Y., offices at 14-16 Thirty-eighth Street. Offices, display rooms and warehouses are thus centered at one location.

J. D. Underhill has been made vice-president of the Okonite Co., the Okonite-Callender Co., and Hazard Insulated Wire Works, with headquarters at 501 Fifth Ave., New York, N. Y. Until recently, Mr. Underhill was sales manager.

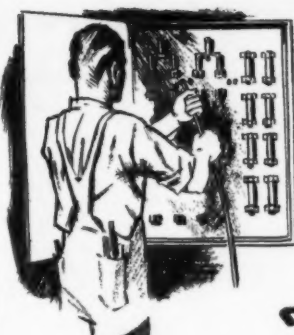
The Graybar Electric Co. announces the appointment of Karl L. Thielscher as merchandising manager of its Philadelphia, Pa., office. Mr. Thielscher has been associated with the Graybar Electric Co. since 1919, having worked in the New York, Buffalo and Syracuse offices during this period.

Kwikon Co., Chicago, Ill., announces the following agency appointments: Royal Smith, 912 Commerce St., Dallas, Tex.; Gulf States Sales Co., 1225 St. Charles Ave., New Orleans, La.; E. H. Bell, 5706 Long Beach Ave., Los Angeles, Calif., and Crescent Sales Co., 298 Duquesne Way, Pittsburgh, Pa., with branches at 103 Aurora St., Lancaster, N. Y., and 217 S. Front St., Harrisburg, Pa.

Killark Electric Mfg. Co., St. Louis, Mo., announces the appointment of the following representatives: W. J. Wick-enheiser, New York, N. Y., covering Metropolitan New York; Walter E. Daw, 164 Oliver Street, Boston, Mass., covering New York State outside the Metropolitan area; and H. R. Hopkins Co., 95 Fairmount Ave., Philadelphia, Pa., covering Southern New Jersey and Eastern Pennsylvania.

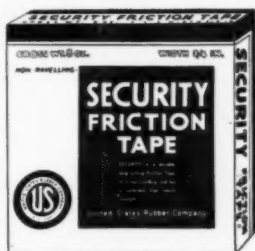
The Allen-Bradley Co., Milwaukee, Wis., has appointed Claude O. Sargent to the sales staff of the Philadelphia office. For the past five years, Mr. Sargent has been district sales manager of the Pittsburgh, Pa., office of the Louis-Allis Company. Other sales appointments recently announced are: Robert McGarry in Utica, New York; Bjorn Hansen in charge of sales in Springfield, Ill.; R. B. Soderberg at the Hartford, Conn., office; and W. J. Hess at the Charleston, W. Va., office.

*Electrical Contracting, June 1935*



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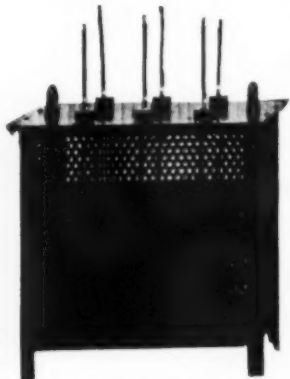
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## Manufacturers' Bulletins . . .

**Motors and Transformers:** The "Wagner Circle," a 10-page booklet describes the Wagner line of products, and certain selected features of design. Wagner Electric Corp., St. Louis, Mo.

**Condensers:** Catalog No. 152, 24 pages, describes and illustrates electrolytic and oil impregnated condensers for industrial uses. The Aerovox Corp., Brooklyn, N. Y.

**Stoker Firing:** Two illustrated folders discussing essential points in selling automatic stoker firing for small commercial prospects. Link Belt Co., Chicago, Ill.

**"Speed-Arc" Welders:** Bulletin 910, sixteen pages, describes a new high power factor, high speed welder line. Ideal Electric and Mfg. Co., Mansfield, Ohio.

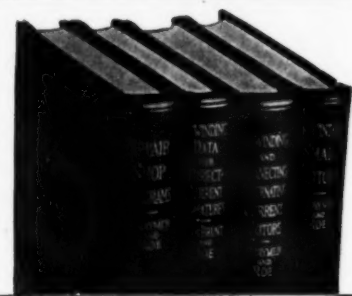
**Conditionaire:** The 1935 line of Guth-fan combined air circulating and lighting units is covered in catalog no. 6, 16 pages. Many new styles which have been developed for 1935 are illustrated. The Edwin F. Guth Co., St. Louis, Mo.

**Switch Boxes:** A twelve-page booklet which lists and illustrates the various switch boxes, connectors and fittings of the "National" line. Arranged to show boxes and connectors for each wiring system. National Electric Products Corp., Pittsburgh, Pa.

**Air Conditioning:** A twenty-four page bulletin illustrating twenty-one recent installations of Ilg cooling and air conditioning equipment in shops, restaurants, etc., also testimonials from users. A dealer help. Ilg Electric Ventilating Co., Chicago, Ill.

**Ventilation and Air Cooling:** A sixteen-page illustrated bulletin containing details and tables for Ilg attic house and apartment cooling and ventilating systems, where to place the unit, the various registers to attic spaces, etc. A discussion of house cooling principles. Ilg Electric Ventilating Co., Chicago, Ill.

**Pipe Tools:** A small folder containing technical information on pipe tools. The relation between two present methods of adjustments for cutting oversize, standard and undersize threads is illustrated, also a letter-size specification form for portable pipe and bolt threading machines, this being accompanied by a four-page "Model-A Picture Story" folder on Beaver Model-A equipment with testimonials from users. Beaver Pipe Tools, Inc., Warren, O.



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Electrical Contracting, June 1935

**Chime Calls:** Bulletin No. 65, eight pages, covers the Faraday line of chime calls, residence call panels, repeater push buttons and plates. Stanley & Patterson, New York, N. Y.

**Lugs-Connectors:** Trade price sheet No. 36, illustrates and lists one and two-hole soldering and solderless lugs, wire connectors, fuse clips, and brass terminal cup washers. Dante Electric Mfg. Co., Bantam, Conn.

**Polyphase Motors:** An 8-page bulletin No. 6-1 features various types of motors from  $\frac{1}{4}$  to 600 h.p., for air conditioning installations, refrigeration, blowers, fans, pumps, etc. Century Electric Co., St. Louis, Mo.

**Circuit Breakers:** Catalog No. 1834, 28 pages, covers type "ET" and "ETF" circuit breakers from 15 to 600-amp. ratings for load centers, panelboards, power panels, switchboards, and separate industrial units. I. T. E. Circuit Breaker Co., Philadelphia, Pa.

**Carbon Resistors:** "Ohiohm" LV low resistance carbon resistors for industrial electronic control apparatus and radio hook-ups. Folder contains graphs covering performance and characteristics. The Ohio Carbon Co., Lakewood, O.

**Wire Guide:** A convenient twelve-page bulletin full of useful information covering twenty types of insulated wires, cords and cables. These data are easy to read and include outside diameters of conductors, types of coil packages, etc. The Collyer Insulated Wire Co., Pawtucket, R. I.

**Wiring Methods:** An 88-page "Handbook for the Man on the Job," illustrates installation methods for surface and under-plaster metal raceways. The correct methods for using various fittings at outlets, at conversions to conduit or armored cable wiring, and for making bends around corners are illustrated. National Electric Products Corp., Pittsburgh.

**Telephone Equipment:** Bulletins Nos. 96-A, B, C, D, covering sub-station telephones for master station and lamp switchboard systems; lamp type telephone switchboards; master-station telephone systems; and "Powerite" a.c. to d.c., rectifying units for private telephone systems. S. H. Couch Co., Inc., North Quincy, Mass.

### Classified Advertising

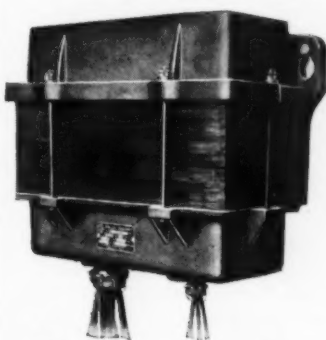
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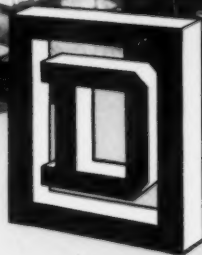
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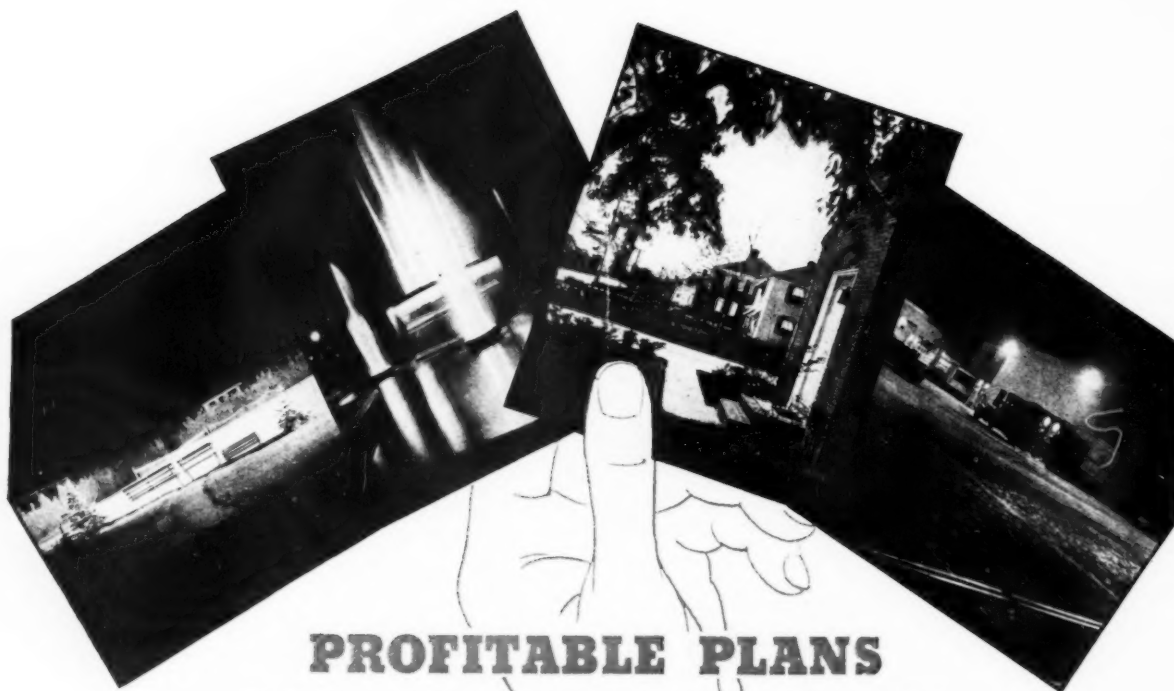
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